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Vol. 36 No. 1

JANUARY 1961

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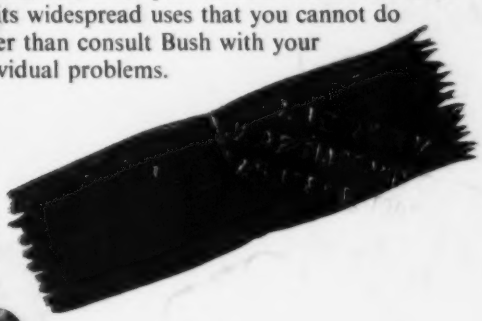

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Food Technology

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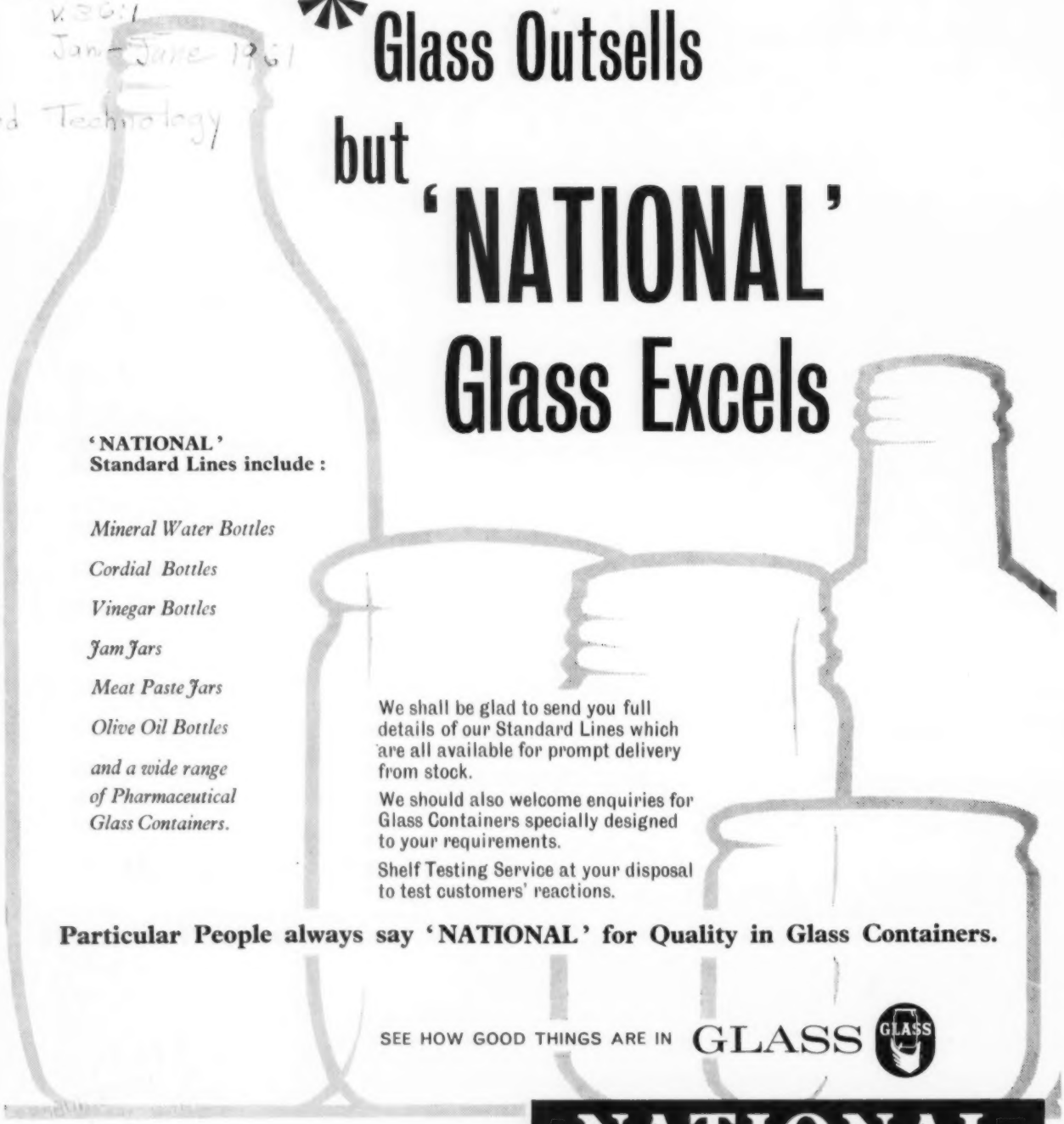

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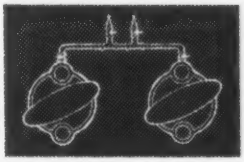

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Index to ADVERTISERS

	Page
Advita, Ltd.	Oct.
Agricultural & Chemical Products, Ltd.	A70
Aiton & Co., Ltd.	Dec.
Albrin Products, Ltd.	A57
Albro Fillers & Engg. Co., Ltd.	Dec.
Alexandra Separator Co.	A54
Alfa-Laval Co., Ltd.	A15
Allen, Stafford, & Sons, Ltd.	A27
Alloa Glass Works Co., Ltd.	A5
Allspeeds, Ltd.	Dec.
Amasal, Ltd.	A61
Amber Oils, Ltd.	Nov.
A.P.V., Co., Ltd.	A24
Associated Metal Works, Ltd.	A38
Baker Perkins, Ltd.	Dec.
Barron, W.S., & Son, Ltd.	Oct.
Barry Wehmiller & Co., Ltd.	Oct.
Beddington Nut & Produce Co., Ltd.	A60
Begg, Cousland & Co., Ltd.	Dec.
Bellingham & Stanley, Ltd.	Dec.
Benjamin Electric, Ltd.	Sept.
B.E.N. Patents, Ltd.	Oct.
Bliss, E. W. (England), Ltd.	A22
Boehm, Fredk., Ltd.	Nov.
Boulton, William, Ltd.	Dec.
Bramwell, S., & Co., Ltd.	A14
Brierley, Wm., Collier & Hartley, Ltd.	A64
British Arkady Co., Ltd.	A38
British Belting & Asbestos, Ltd.	Nov.
British Cellophane, Ltd.	A20
British Dairy Farmers Assn.	Oct.
British Hydrological Corporation	A55
British Nylon Spinners, Ltd.	Dec.
British Rayophane, Ltd.	Dec.
British Sidac, Ltd.	Dec.
British Soya Products, Ltd.	A36
British Transport Commission	A10
Broadbent, Thomas, & Sons, Ltd.	Nov.
Brown & Polson, Ltd.	Oct.
Bryan, Wm., Ltd.	A10
Bush, W. J., & Co., Ltd.	Cover 1
Busse, Paul	Sept.
Butter Information Council	A9
Butterfield, W. P., Ltd.	Dec.
Butterley Co., Ltd.	Dec.
Caleb Duckworth, Ltd.	A14
Calfos, Ltd.	A50
Cambridge Instrument Co., Ltd.	Nov.
Cascelloid	Nov.
Caxton Chocolate Co., Ltd.	Oct.
Clarke, George, & Co., Ltd.	Oct.
Coates Bros, Ink, Ltd.	Nov.
Cohen, Geo,. Sons & Co., Ltd.	Oct.
Colt Ventilation, Ltd.	A47
Commer Cars, Ltd.	Nov.
Conveyor & Shotblast, Ltd.	Dec.
County Chemical Co. Ltd.	A67
C.P. Equipment, Ltd.	A62
Cradley Boiler Co. Ltd.	Oct.
Crofts (Engineers) Ltd.	A33
Crompton Parkinson, Ltd.	Sept.
Crookes Laboratories, Ltd.	A38
Cuxson, Gerrard & Co., Ltd.	Dec.
Dallow, Lambert, Ltd.	A12
Daniels, S., & Co., Ltd.	A50
Dawson Bros., Ltd.	A39
Dodge Bros. (Gt. Britain), Ltd.	Oct.
Dodman, Alfred, & Co., Ltd.	A48
Drakesons	A70
Dring, J., Ltd.	A56
Duche, T. M., & Sons, Ltd.	Dec.
Elliott Bros. (London), Ltd.	Dec.
English Grains Co., Ltd.	Oct.
Fisher's Foils, Ltd.	Dec.
Flexibox, Ltd.	Nov.
Florasynthe Laboratories (England), Ltd.	Nov.
Foodtech, Ltd.	A3
Foster Instrument Co., Ltd.	Nov.
Fraser, J., & Son, Ltd.	A63
Frigidaire Division of General Motors, Ltd.	Sept.
Fuller Horsey, Sons & Cassell	A62
Gas Council	Cover 4
Gascoigne & Kingston, Ltd.	Oct.
Giusti, T. & Son, Ltd.	A45
Glass Manufacturers' Federation	A59
Gordon & Gotch (Sellotape), Ltd.	Dec.
Graviner Manufacturing Co.	A63
Greening, N., & Sons, Ltd.	A52
Gummers, Ltd.	Dec.
Gunson, R. W., (Seeds), Ltd.	Dec.
Haas Vakuum-Technik (G.m.b.H.)	Dec.
Hart, W. J., Ltd.	A44
Heston Equipment Co., Ltd.	Oct.
Hodgson, Richard, & Sons, Ltd.	Nov.
Holmes, W. C., & Co., Ltd.	A43
Honeywell Controls, Ltd.	Oct.
Hopkinson, Ltd.	A32
Howard Pneumatic Engg. Co., Ltd.	Dec.
Hunt, John, (Bolton), Ltd.	A54
I.C.I.	A25
Industrial & Commerce Finance Corporation, Ltd.	Dec.
Industrial Tapes, Ltd.	Nov.
IMC S.A. International Machinery Corpn.	Dec.
Iridon, Ltd.	Dec.
Isopad, Ltd.	Sept.
I.S.I.S.,Appointments Register	A65, A66

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Index to ADVERTISERS

	Page
Jackson Bros. (Knottingley), Ltd.	Dec.
Jackson, J. G., & Crockatt, Ltd.	A50
Jenner, A. & C., Ltd.	Dec.
Johnson, A., & Co., (London), Ltd.	Nov.
Johnson, S. H., Co., Ltd.	Dec.
Johnston Lightning Filler Co., Ltd.	Oct.
Jones, Samuel, & Co., Ltd.	A29
Karrier Motors, Ltd.	A49
Kellie, R., & Son, Ltd.	A34-35
Kemball, Bishop & Co., Ltd	Sept.
Kendall, F., & Son, Ltd.	A62
Kestner Evaporator & Engg. Co., Ltd.	Sept.
Key Glassworks, Ltd.	Oct.
King, George W., Ltd.	Nov.
Kingston upon Hull Development Committee	A60
Kirby-Cooper (Glucose), Ltd.	Dec.
Kork-n-Seal, Ltd.	A23
Lambert, L., & Co., Ltd.	Dec.
Loders & Nucoline, Ltd.	A58
London Fumigation Co., Ltd., The	A60
Lyon, Arthur, & Co. (Engrs.), Ltd.	A48
Manesty Machines, Ltd.	Dec.
Marley Concrete, Ltd.	Nov.
Mason & Morton, Ltd.	A6
Mather & Platt, Ltd.	A51
May & Baker, Ltd.	A28
Metal Box Co., Ltd.	A19, A21, A40
Metal Closures, Ltd.	Nov.
Metal Propellers, Ltd.	Oct.
Milk Products (N.Z.), Ltd.	A41
Mitchell, L. A., Ltd.	Oct.
Mittelhauser & Walter	A52
Mono Pumps Ltd.	A28
Monsanto Chemicals, Ltd.	Nov.
Moore, J. W., & Co., Ltd.	A64
Munton & Fison, Ltd.	A30
Myers, Fred., Ltd.	Dec.
National Glass Works (York), Ltd.	Cover 2
Negretti & Zambra, Ltd.	Nov.
Newman Labelling Machines, Ltd.	Nov.
Norman Engg. Co.	Dec.
Oakes, E. T., Ltd.	Dec.
Oxoid Division of OXO Ltd.	Sept.
Padley & Venables, Ltd.	Nov.
Permoglaze, Ltd.	Nov.
Pickfords	A63
Plenty & Son, Ltd.	A53
Polak & Schwarz (Eng.), Ltd.	Nov.
Premier Filterpress Co., Ltd.	Dec.
Rapid Magnetic, Ltd.	A44
Rayner & Co., Ltd.	Oct.
Realm Engg. Works, Ltd.	A32
Reed Medway Sacks, Ltd.	Text p.42
Remploy, Ltd.	Nov.
Richard Thomas & Baldwins, Ltd.	Cover 3
Roche Products, Ltd.	A4
Rozalex, Ltd.	Nov.
Russell Constructions, Ltd.	Sept.
Samuelson, P., & Co.	A61
Saunders Valve Co., Ltd.	A61
Sauven Perforating Machine Co., Ltd.	Dec.
Scan, Ltd.	Nov.
Sharples Centrifuges, Ltd.	Nov.
Signode, Ltd.	Dec.
Simon, Henry, Ltd.	Dec.
Skerman, C., & Co., Ltd.	A79
SMALL ADVERTISEMENTS	A68-70
Sofior Ltd.	Dec.
Soya Foods, Ltd.	Nov.
Spesco Development, Ltd.	Dec.
Stainless Steel Plant, Ltd.	Nov.
Stainless Steel Pumps, Ltd.	Nov.
Steel Co. of Wales, Ltd., The	A16
Stevenson & Howell, Ltd.	A46
Stokes & Dalton, Ltd.	A13
Sturge, J. & E., Ltd.	A31
Taylor Rustless Fittings Co., Ltd.	A18
Technoexport	Dec.
Thames Board Mills, Ltd.	Sept.
Thompson (Wilson Boilers) John, Ltd.	Dec.
Trist, Ronald, Ltd.	A7
Turner Bros., Asbestos Co., Ltd.	Dec.
Unigate (Milk Products) Ltd.	Nov.
United Glass, Ltd.	A26
Venesta Foils Ltd.	A11
Viscose Development Co., Ltd.	Dec.
Vitamins, Ltd.	A36
Vulcan Foundry, Ltd.	A37
Warwick Production Co., Ltd.	Nov.
Webster, I., & Sons, Ltd.	A64
Welch, J. A., Ltd.	A8
Wetter, J. C., & Co., Ltd.	A46
White, Tomkins & Courage, Ltd.	A42
Whittaker, Arthur	Dec.
Wiggins Teape (Mill Sales), Ltd.	Sept.
Willcox, W. H., & Co., Ltd.	A18
Williams (Hounslow), Ltd.	Dec.
Worthington Simpson, Ltd.	Nov.
Wright Hargreaves, Ltd.	A17
Wynmouth Lehr & Co., Ltd.	A60
Youngman, W. C., Ltd.	A64
Zimmerman, C., & Co., Ltd.	Dec.

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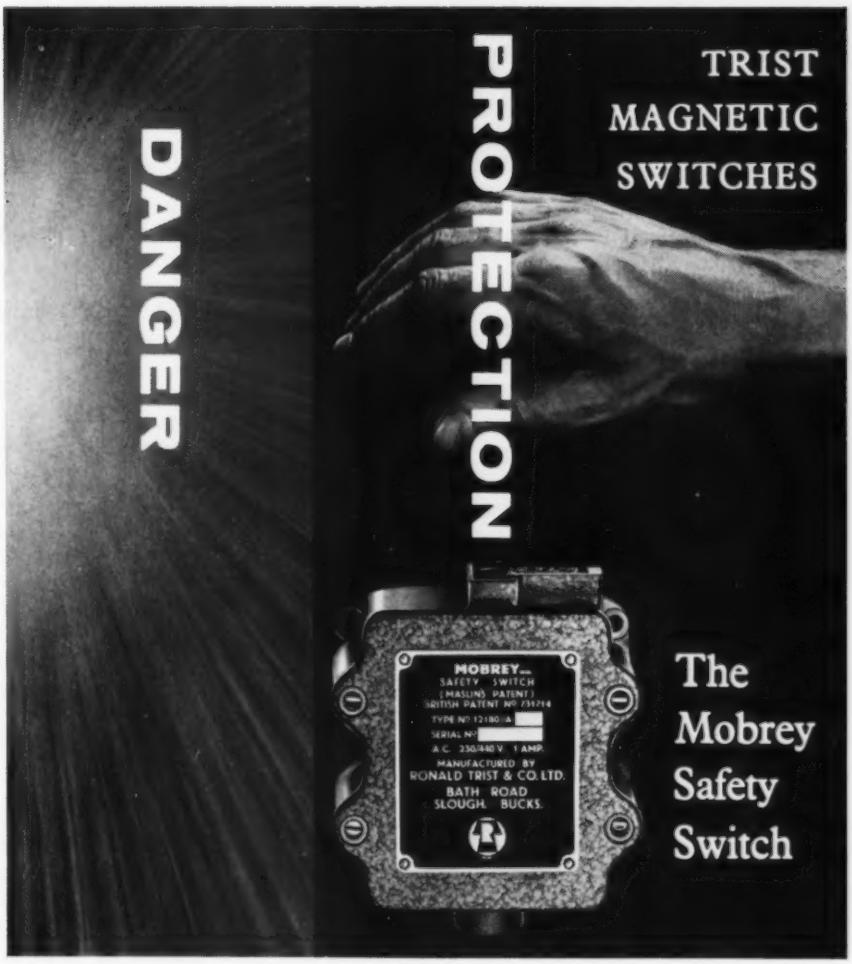

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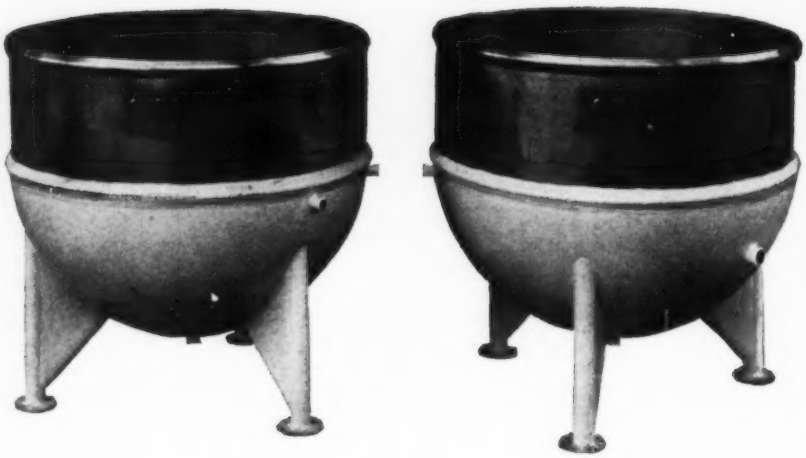

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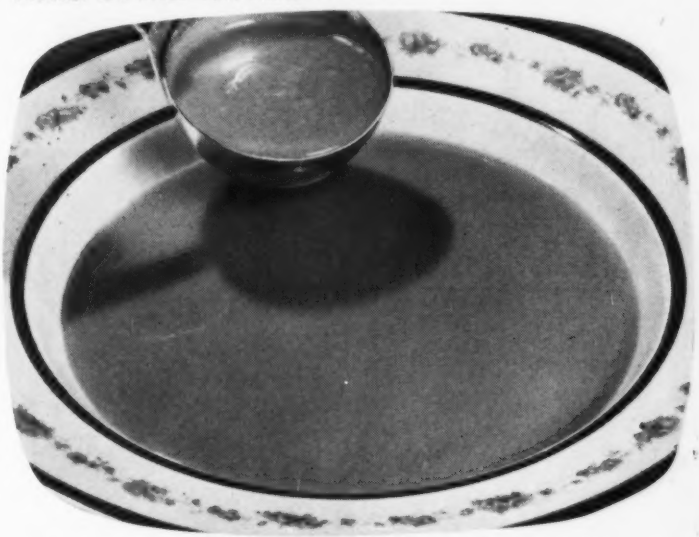

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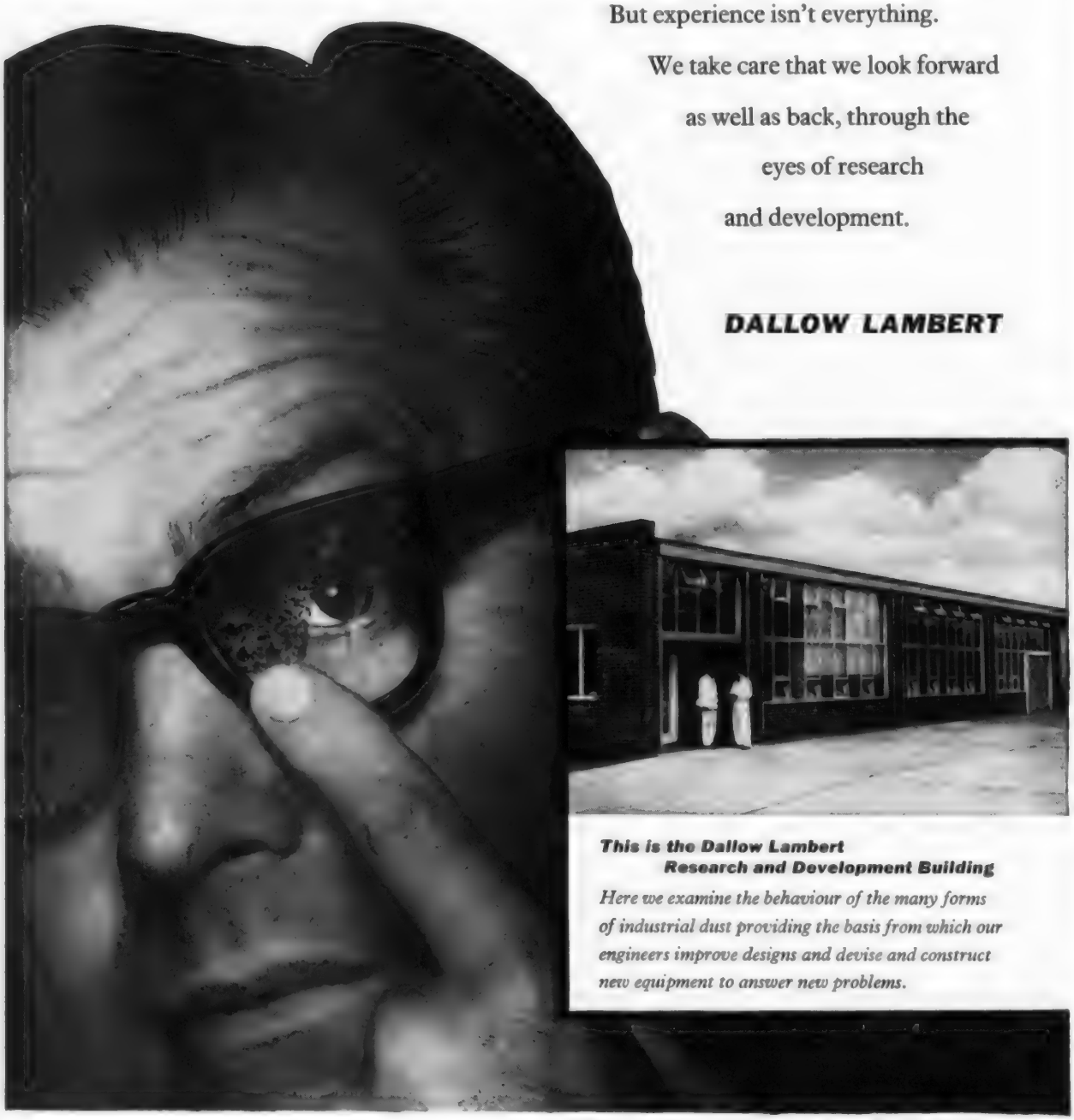

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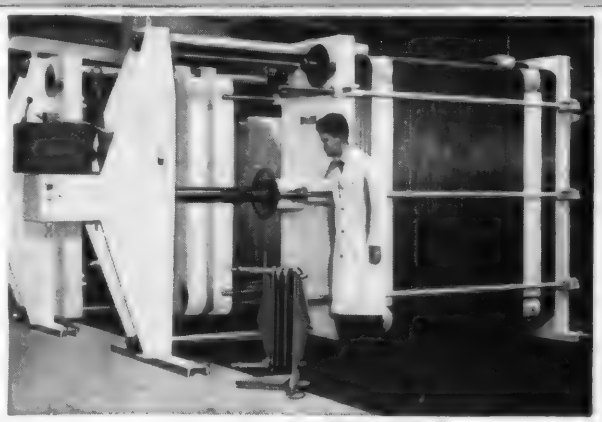

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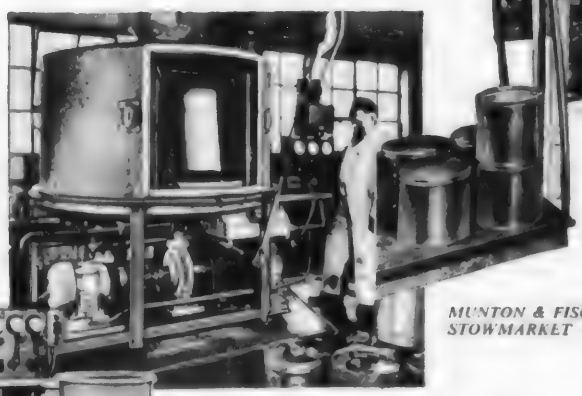

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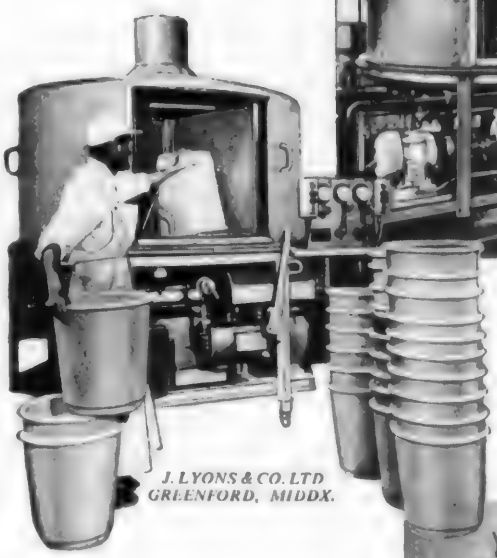

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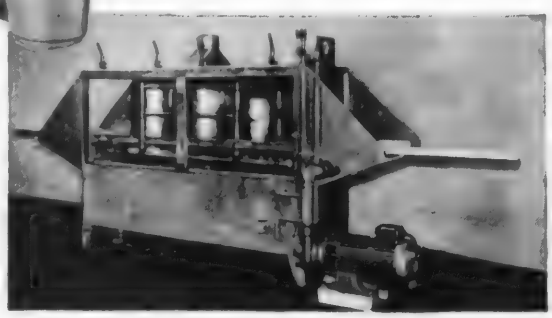

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W. H. washing equipment handles containers with amazing speed and thoroughness. Out they come, clean as whistles, completely ready for further service.

W. H. have solved can, churn and container washing problems in many industries, and their wealth of experience is freely at your disposal. If you have a container-washing problem, Wright Hargreaves can supply the answer—either as a standard machine, or as equipment specially tailored to meet your individual requirements.

Hand-fed and Automatic rotary equipment for washing/sterilizing containers at a rate of up to 360 per hour.

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Wright Hargreaves are the sole agents in England, Scotland and Wales for Silkeborg Plate Heat Exchangers that meet the highest standards of the food industry.

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STAINLESS STEEL

Jacketed Mixing Vessels

These vessels are made with great care and skill from first quality stainless steel. They are finished with a dull polish inside. Design features in the example illustrated include a slow speed gate type mixer driven by one motor and a concentric medium speed propeller type mixer driven by a separate motor. This particular installation was made to suit the purchaser's own requirements.

We should be pleased to receive your enquiries for any type of stainless steel equipment.

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GOLD STAR Laminated pockets for Heinz soups.
Manufacturer, and functional designer.

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Manufacturer, and functional designer.

SILVER STAR Metathene pack for Twinings Caterers' Coffee.
Manufacturer, and functional designer.

Certificates of Merit Metathene sachets for Amanda soft drinks.
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GOLD STAR Poly-Tainer plastic bottle for Silvikrin. (*Retail Consumer Pack Supreme Award.*) *Manufacturer of container.*

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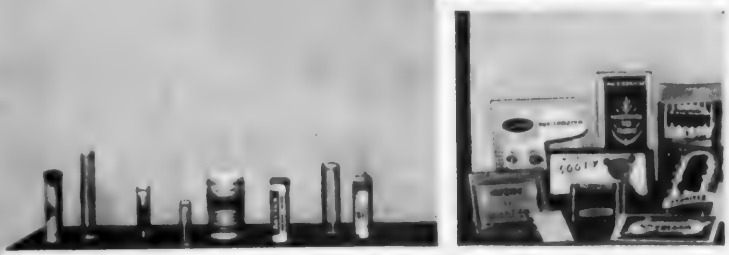
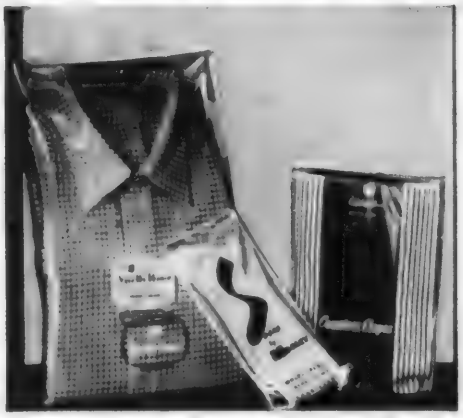
"Cellophane" is the registered trade mark of British Cellophane Limited and denotes the brand of cellulose film manufactured by them.

Plastic packaging by METAL BOX





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PLASTICS GROUP
PLASTIC FILMS · LAMINATIONS · BOTTLES · MOULDED CONTAINERS

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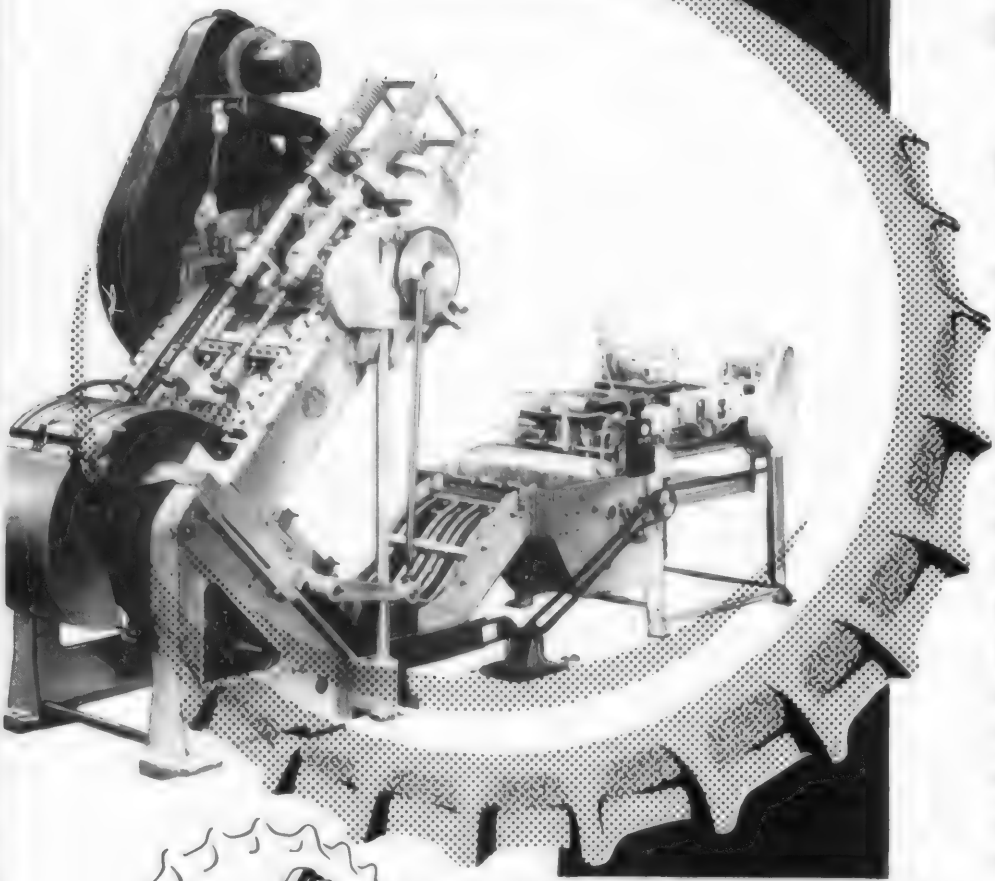
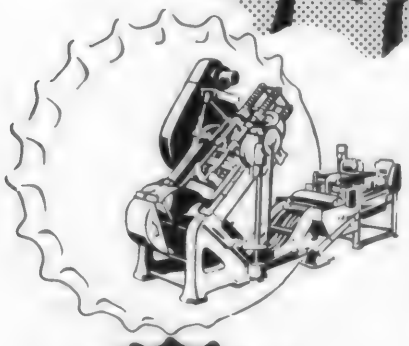
BLISS

Automatic BOTTLE CAP PRESSES



In answer to bottlers' demands for literally billions of crown caps, E. W. Bliss Co. offers a complete line for their rapid and economical production.
Key machine in the line is the Bottle Cap Press, of which two models are available. Completely automatic in operation, the operator need only keep the magazine filled to ensure continuous effective operation of the press.



No. 37 (16 die) fitted with rolling key clutch and spring counterbalance operates at 110 strokes per minute and gives up to 352 caps per sheet.

No. 37A (24 die) fitted with air operated friction clutch and air counterbalance on slide, operates at 130 strokes per minute and gives up to 528 caps per sheet.

E.W.BLISS (ENGLAND) LTD
CITY ROAD · DERBY
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London Office: 2-3 The Sanctuary
Westminster S.W.1. Tel: Abbey 3651

SM/EWB 6247

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Kork-N-Seal make a wider variety of closures than any other British manufacturer, for glass, metal and plastic containers. As part of United Glass Ltd., Britain's leading makers of glass containers, they can produce and deliver your closures and glass containers together.

If you need closures, or expert advice on closures, come to Kork-N-Seal. You'll get the best service there is. Please write or 'phone.

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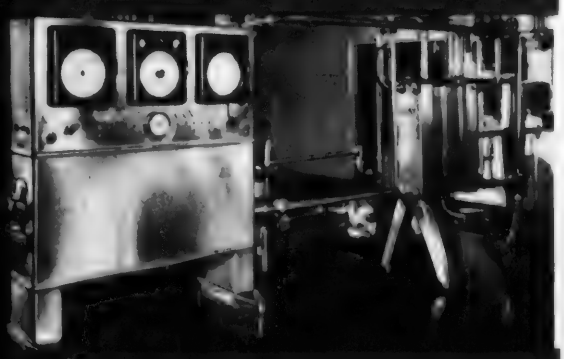
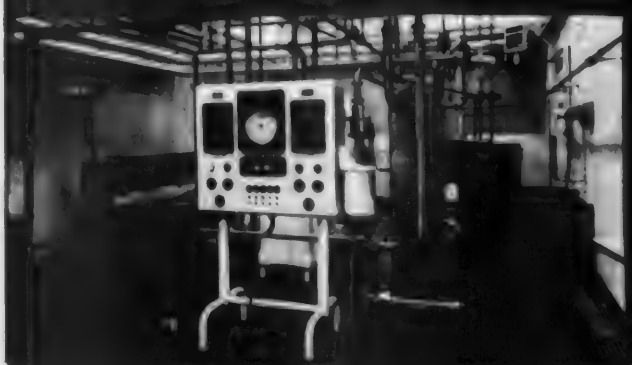
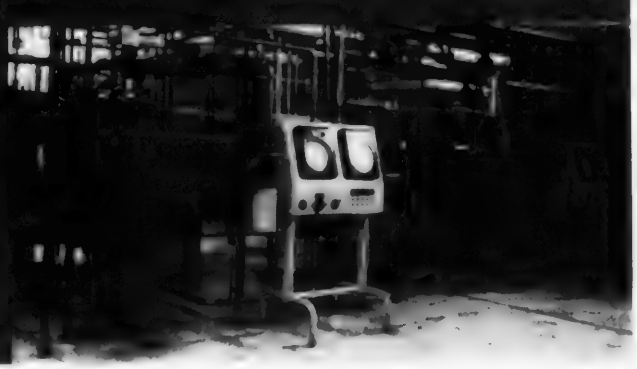




APV Pasteurisation of Liquid Egg. APV Egg Pasteurising Plant, automatic and continuous in operation, ensures the destruction of all harmful organisms under commercial conditions.



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— pure colours for foodstuffs — meet the requirements of the most exacting authorities in the world. Edicol Supra Colours are made in modern plant under strict laboratory control at every stage.

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PLUMAGE: Multi-coloured (flint, pale, green, amber, blue, opal).
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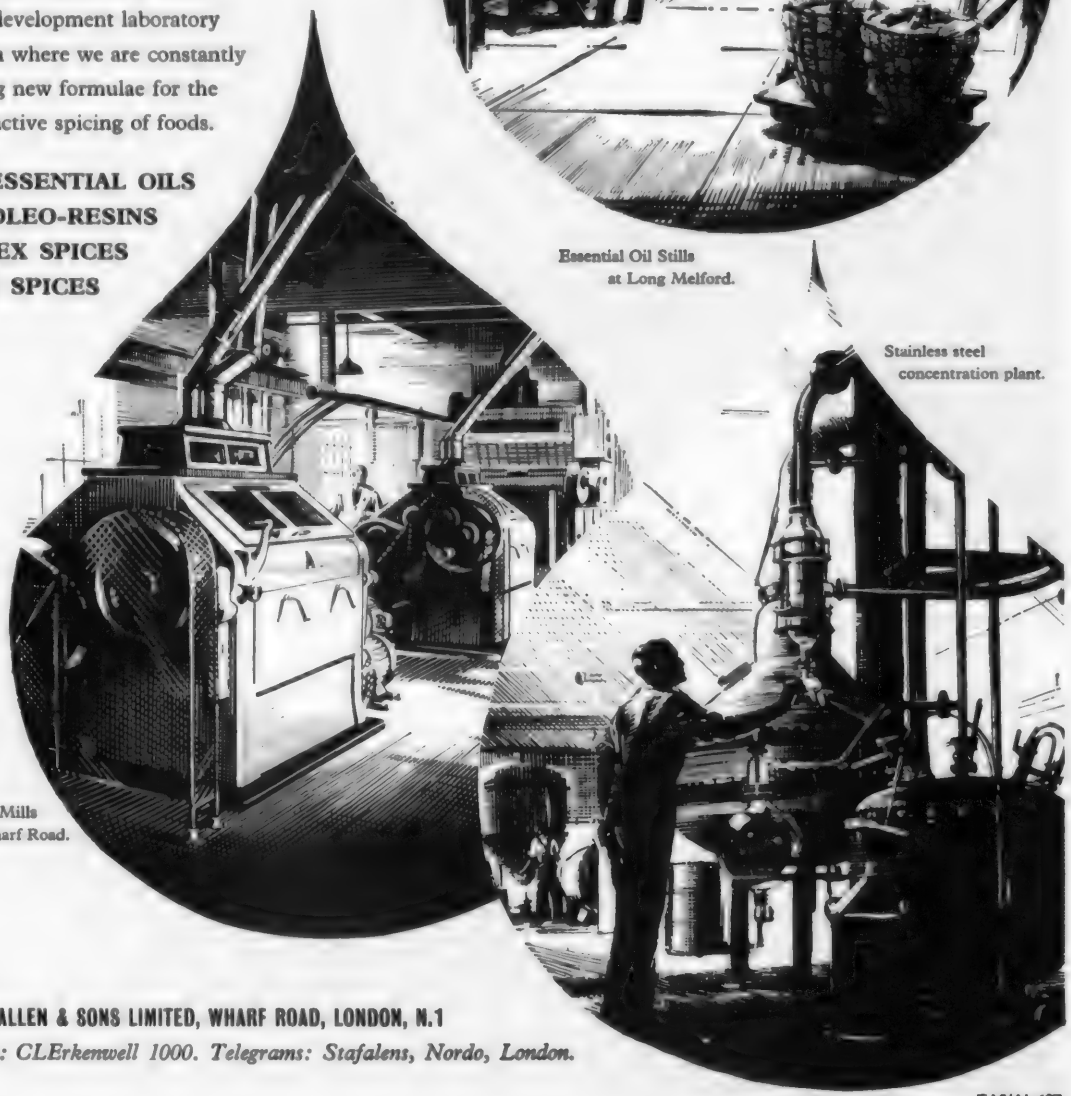
Essential Oil Stills at Long Melford.



Pepper Mills at Wharf Road.

Stainless steel concentration plant.

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Telephone: CLErkenwell 1000. Telegrams: Stafalens, Nordo, London.

TAS/AL.697

MONO takes the biscuit!

For fluids of varying viscosities the steady performance of the **Mono Pump** finds ready application in Bakeries. **The Mono Pump** chosen for Huntley and Palmers Limited for their edible oil plant is shown in this advertisement. Many other large manufacturers have installed **Mono Pumps** in their production lines, not only for handling edible oils, but also for biscuit fillings, fondants or wafer batters.

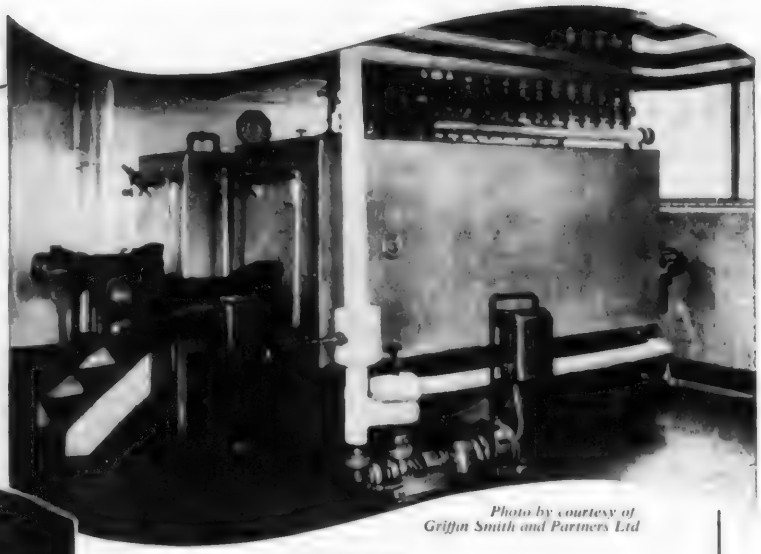

Photo by courtesy of Griffin Smith and Partners Ltd

The MONO pump

MONO PUMPS LIMITED

MONO HOUSE, SEKFORDE ST., LONDON, E.C.1

Telephone: CLErkenwell 8911. Telegrams: Monopumps 'Phone London and at Birmingham, Dublin, Glasgow, Manchester, Newcastle, Wakefield

MP272/L9850

'Embanox'

trade mark *brand*

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The 'Embanox' range of antioxidants provides a means of extending the useful life and retaining the original properties of flavour and odour of fresh fats and oils of good quality.

'Embanox' butylated hydroxyanisole (BHA) - easily soluble in essential and citrus oils at room temperature and may be incorporated simply by direct addition.

'Embanox' liquid formulations are:

'Embanox' 2 a mixture of BHA, BHT, and vegetable oil.

'Embanox' 3 a mixture of BHA, propyl gallate, citric acid, and propylene glycol.

'Embanox' 4 a mixture of BHA, citric acid, and propylene glycol.

A booklet containing full details of the characteristics and methods of use of the 'Embanox' formulations is available free on request.

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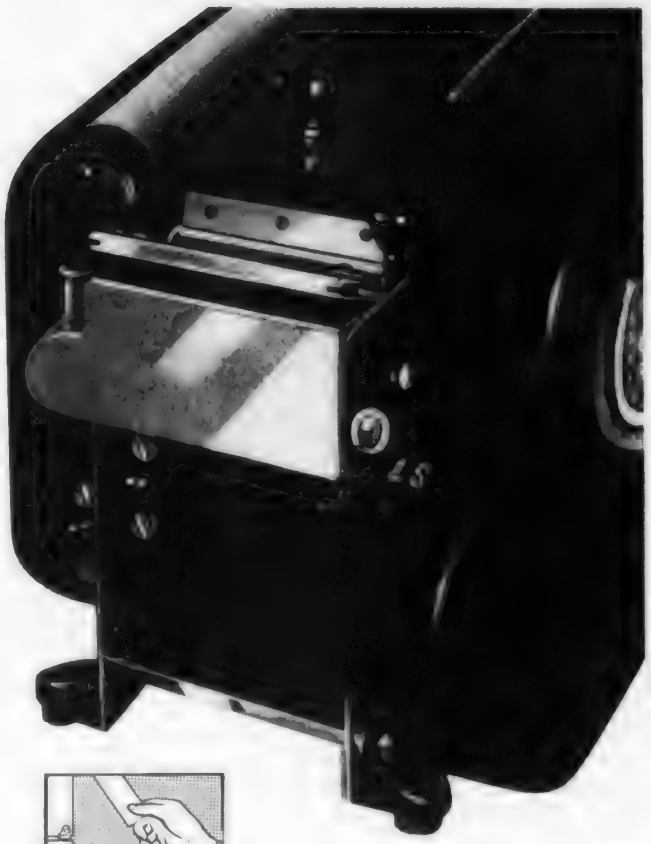
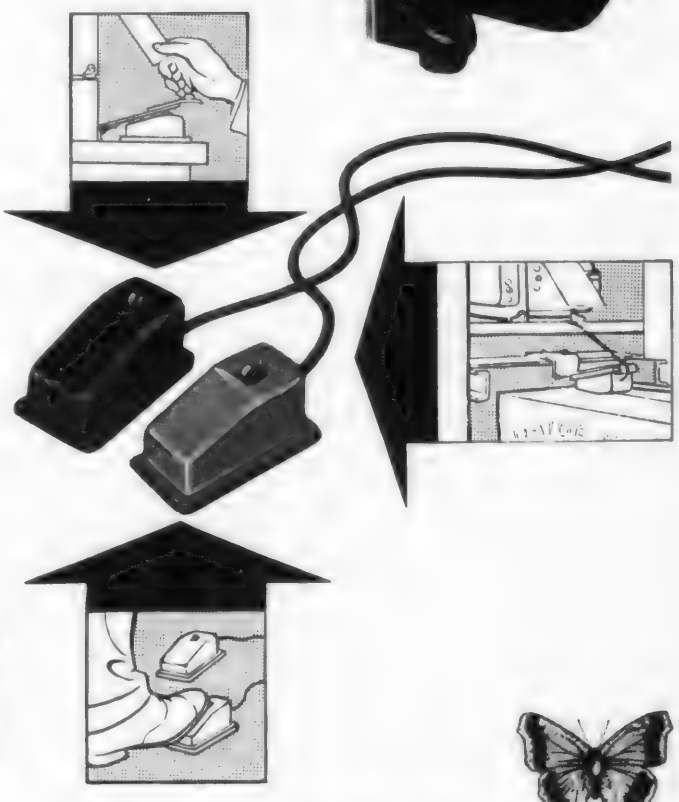
–remote control takes over



A *feather-light* touch of the button . . . and Gumstrip Sealing Tape (Regd.) is moistened . . . cut and delivered. Operation is optionally by foot . . . leaving both hands free for packing. The high-speed Electric Tapeshooter makes work in your despatch department, lighter, quicker, more economical. Special features include ample water reservoir, water heater for quicker adhesion, 4" to 50" length control. May we arrange a demonstration on your premises? Test this machine for 7 days *without* obligation.



ELECTRIC
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BUTTERFLY BRAND

SAMUEL JONES

SAMUEL JONES & CO. LTD., DEPT F/M, NEW BRIDGE ST., LONDON E.C.4. TEL: FLEET STREET 6500

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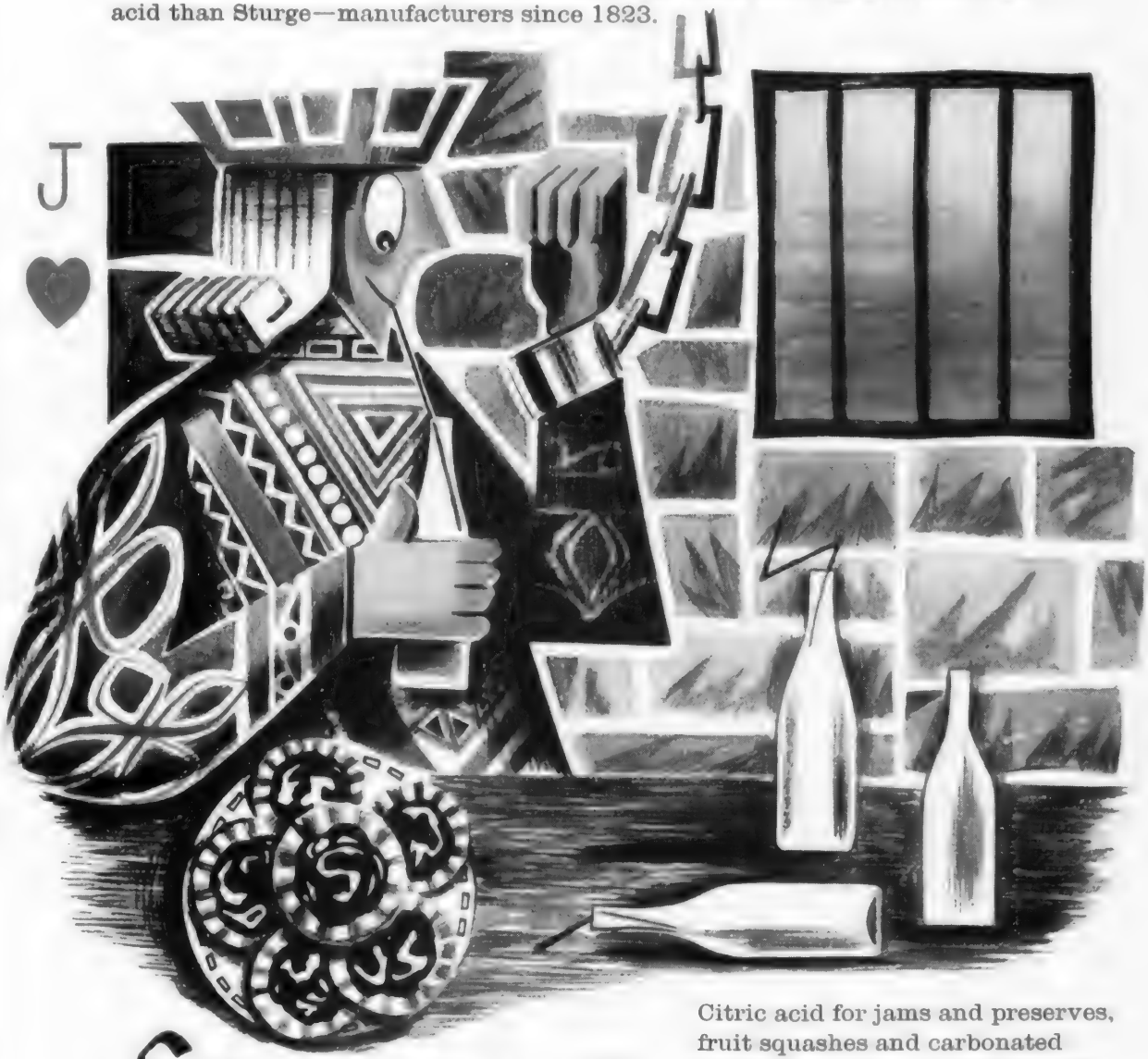

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FIRST NAME IN CITRIC ACID

STURGE CHEMICALS

Citric acid for jams and preserves, fruit squashes and carbonated drinks, ice-cream, confectionery and other food products.

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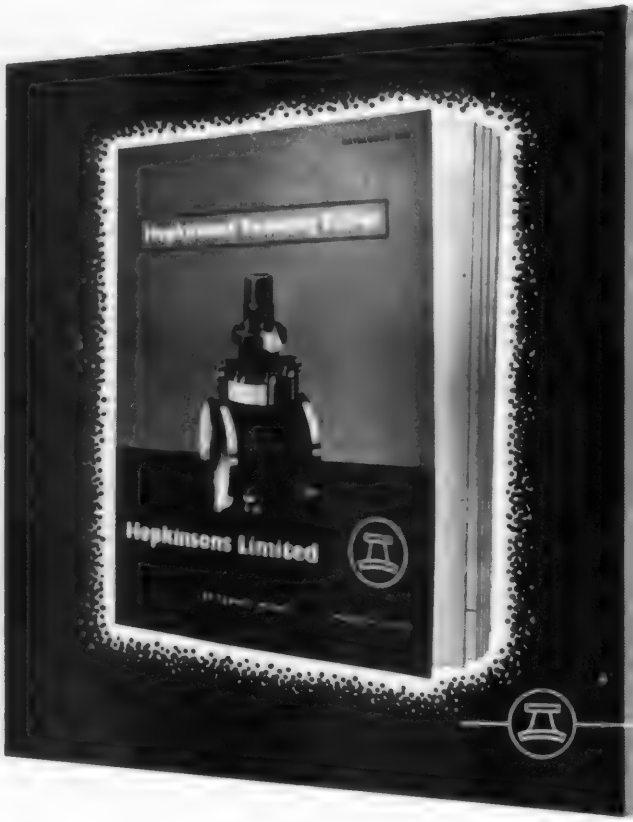

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We invite enquiries for the manufacture of special items.

ALL REALM fittings are made of stainless steel 18/8/3.

Non-return valve

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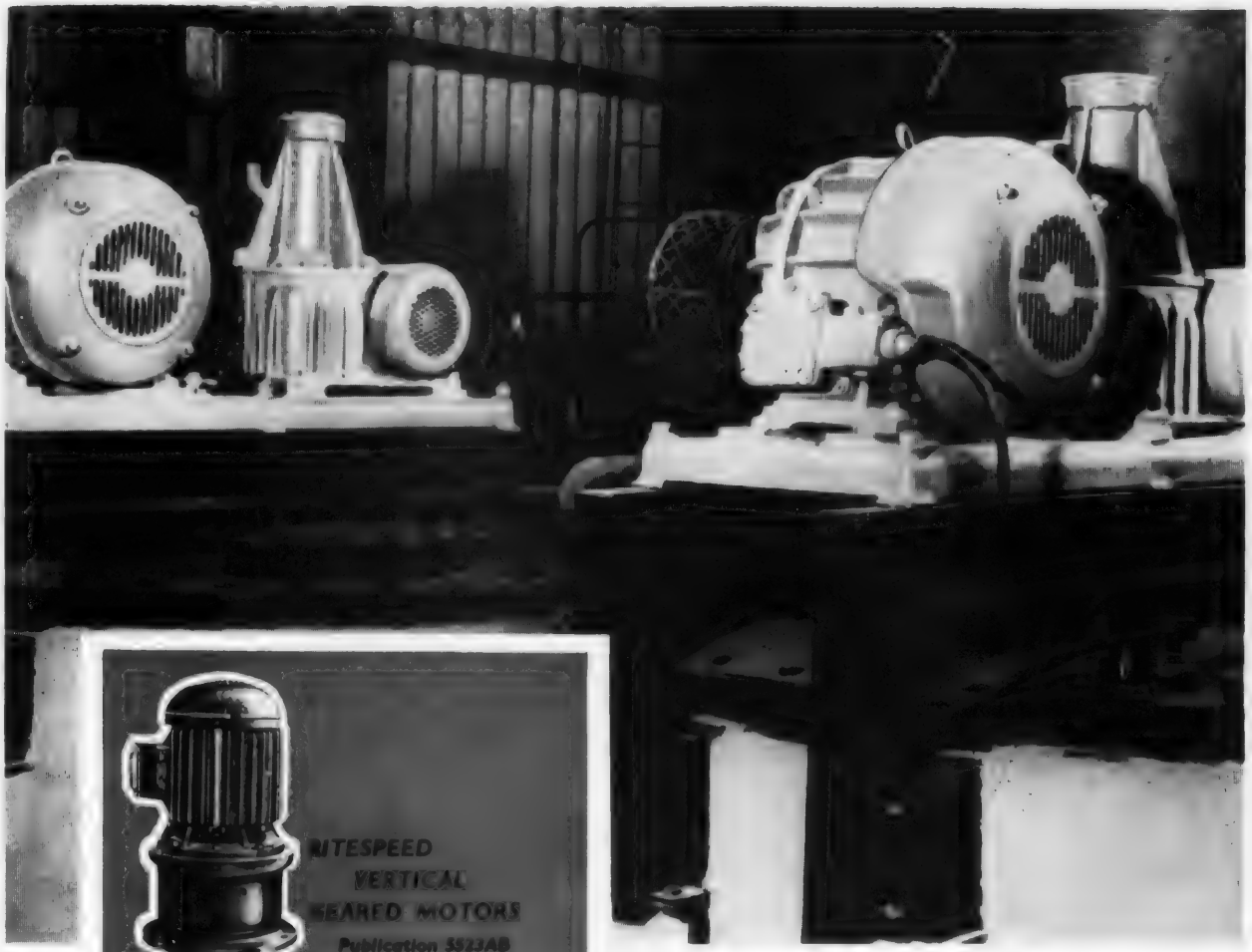
MILTON AVENUE · CROYDON · SURREY *(nearest station: East Croydon, S.E. Region)*

Telephone: THO 8391-3 *Telegrams:* REALMARD, CROYDON



causing a stir!

in more and more food processing factories these days are Crofts Vertical Agitator type worm gears. With their high efficiency, cool running and long life they're proving a baker's boon. In fact for anyone who wants to stir things up they're a must.

Crofts RARV Vertical Agitator type worm gears are available in 13 standardized sizes from 3″ to 24″ centres for powers up to 400 hp and full details are given in Publication 160. Send for your copy today.

✳ *If you're interested in Vertical Agitators you'll probably also want to know about the other Crofts gearboxes shown here.*

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POWER TRANSMISSION ENGINEERS
THORNBURY BRADFORD 3 YORKSHIRE
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Telex 51186 WORLD-WIDE REPRESENTATION

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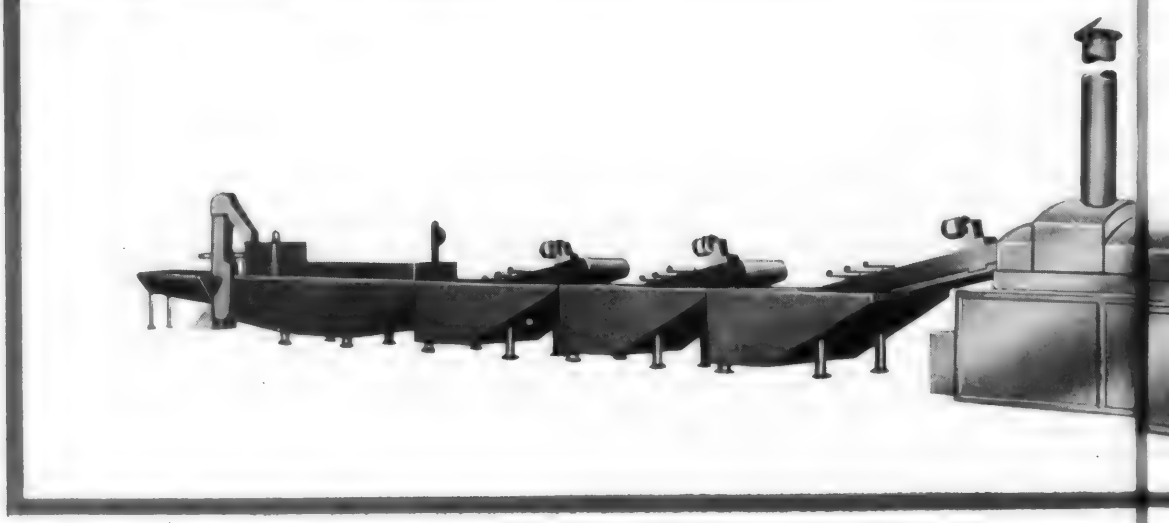

Here is the most modern Potato Crisp Manufacturing Plant now available in Britain . . . except for two operators, this Plant is a complete and fully automatic line which produces Crisps from the peeled potato to the finished product—fresh brown and appetising. KELLIE OF DUNDEE, famous for fifty years in the design and production of Modern Food Plant, can now offer these Potato Crisp Plants to suit individual requirements and such plants can include preparatory equipment (i.e., Peeling, Inspection, Trimming, etc.), and Packaging

KELLIE

FOR MODERN FOOD PLANT

ROBERT KE

THE DUNDEE

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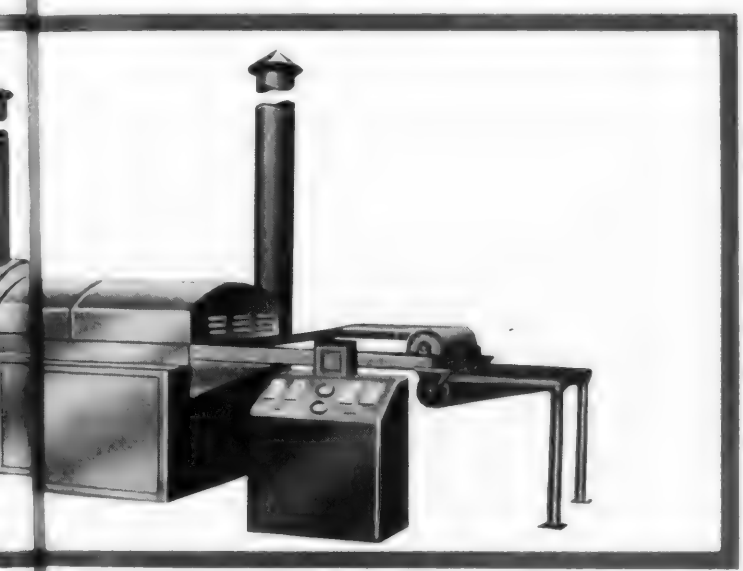
A NEW POTATO CRISP PLANT BY KELLIE OF DUNDEE



SPECIFICATIONS OF STANDARD RANGE OF PLANTS			
CAPACITY	OVERALL LENGTH	OVERALL WIDTH	OVERALL HEIGHT
350 Lbs/HR	64'-9"	10'-0"	7'-0"
500 LBS/HR	64'-9"	11'-0"	7'-0"
750 Lbs/HR	69'-9"	11'-0"	7'-0"
1000 Lbs/HR	69'-9"	12'-0"	7'-0"

Equipment (i.e., Automatic Bag Filling Machines, Sealing Machines, Conveyors, etc.). Either "straight through" or "angled" installations can be manufactured to suit building and other exigencies.

★ ★ ★ ★

Write now for further details of this latest development from KELLIE OF DUNDEE, suppliers of Modern Food Plant to most of Britain's leading manufacturers.

EE & SON LTD.

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FOR MODERN FOOD PLANT

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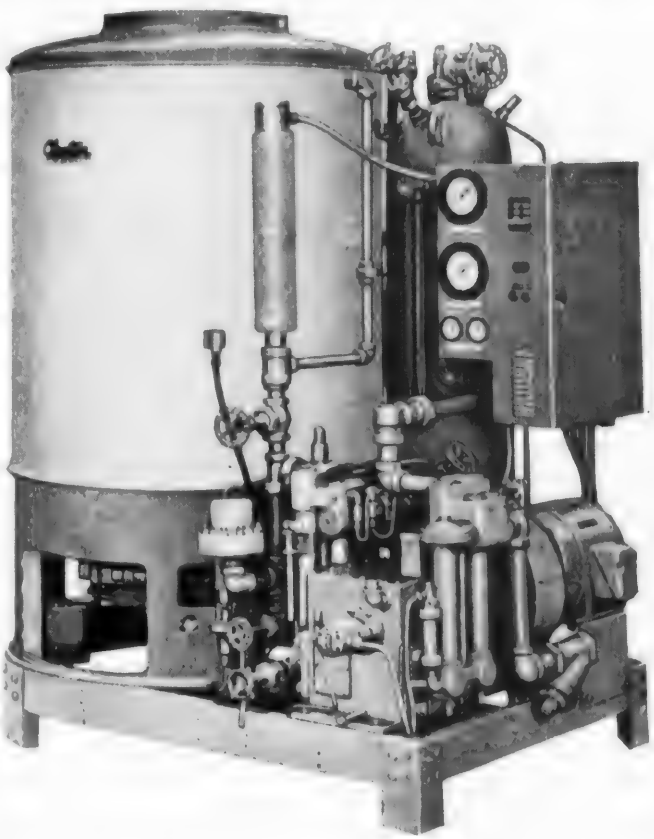
Clayton

Fully automatic oil-fired

STEAM GENERATORS

give *steam instantaneously*

for heating, processing and other auxiliary services with:—



- ★ reduced fuel costs
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- ★ full operating pressure reached in less than five minutes from cold start
- ★ automatic adjustment to steam requirements
- ★ safety, minimum maintenance and easy to service
- ★ spares and service throughout the world

Clayton Steam Generators are available with capacities ranging from 429 lb/hr. to 4600 lb/hr. and can be supplied for firing by fuel oil of 220 or 950 secs. viscosity (Redwood No. 1).

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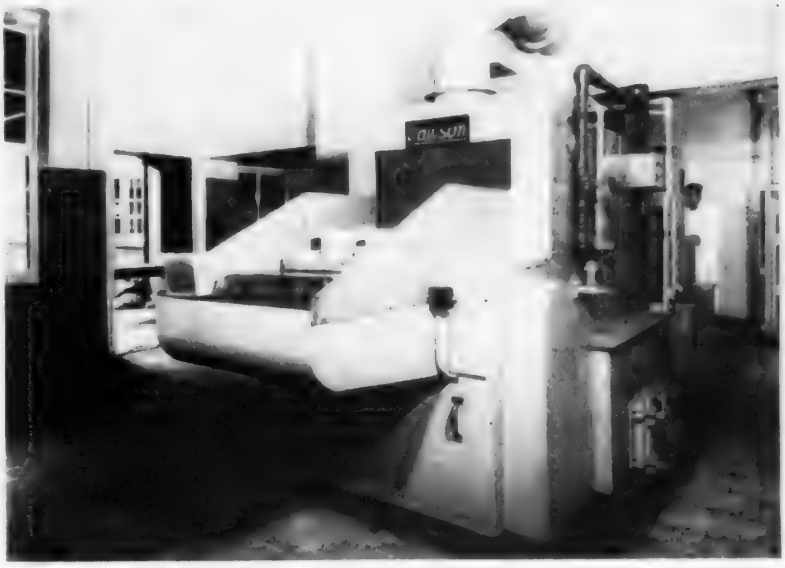

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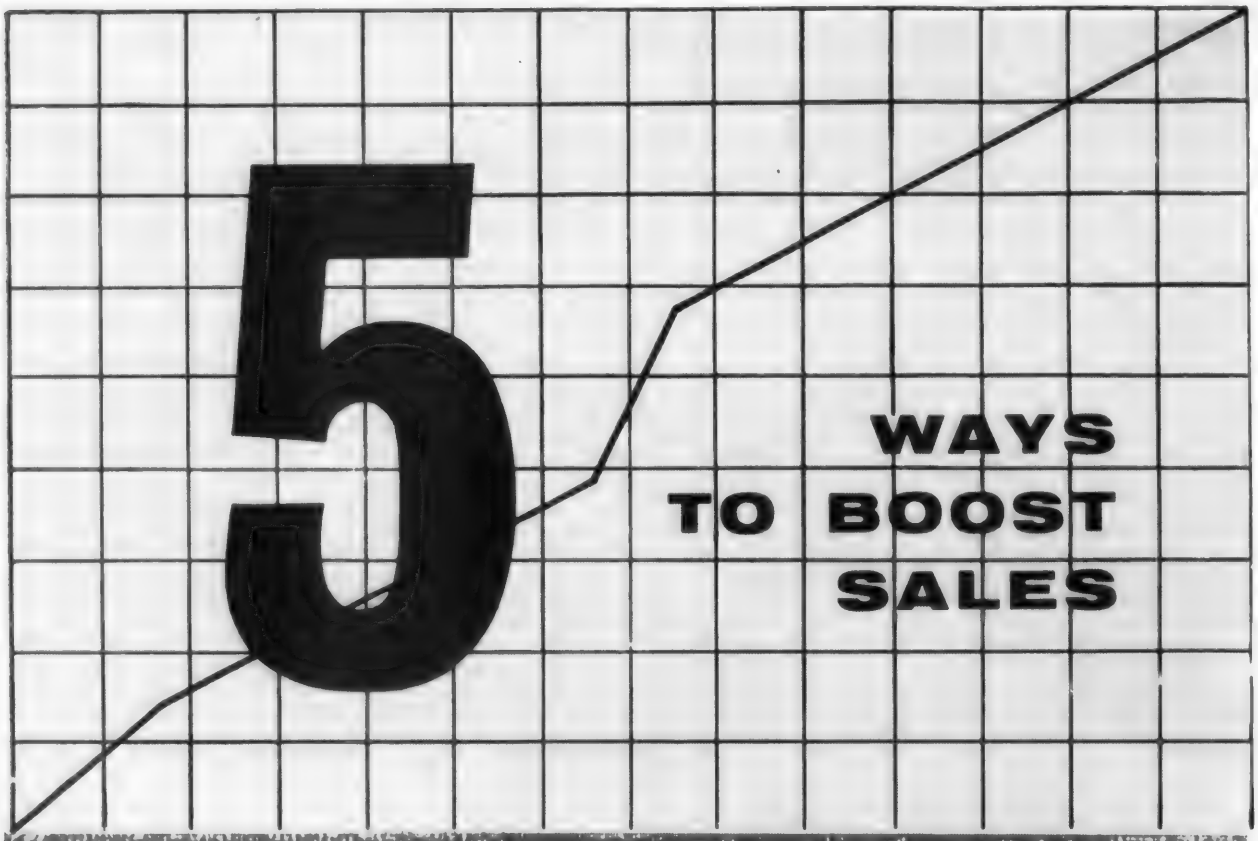

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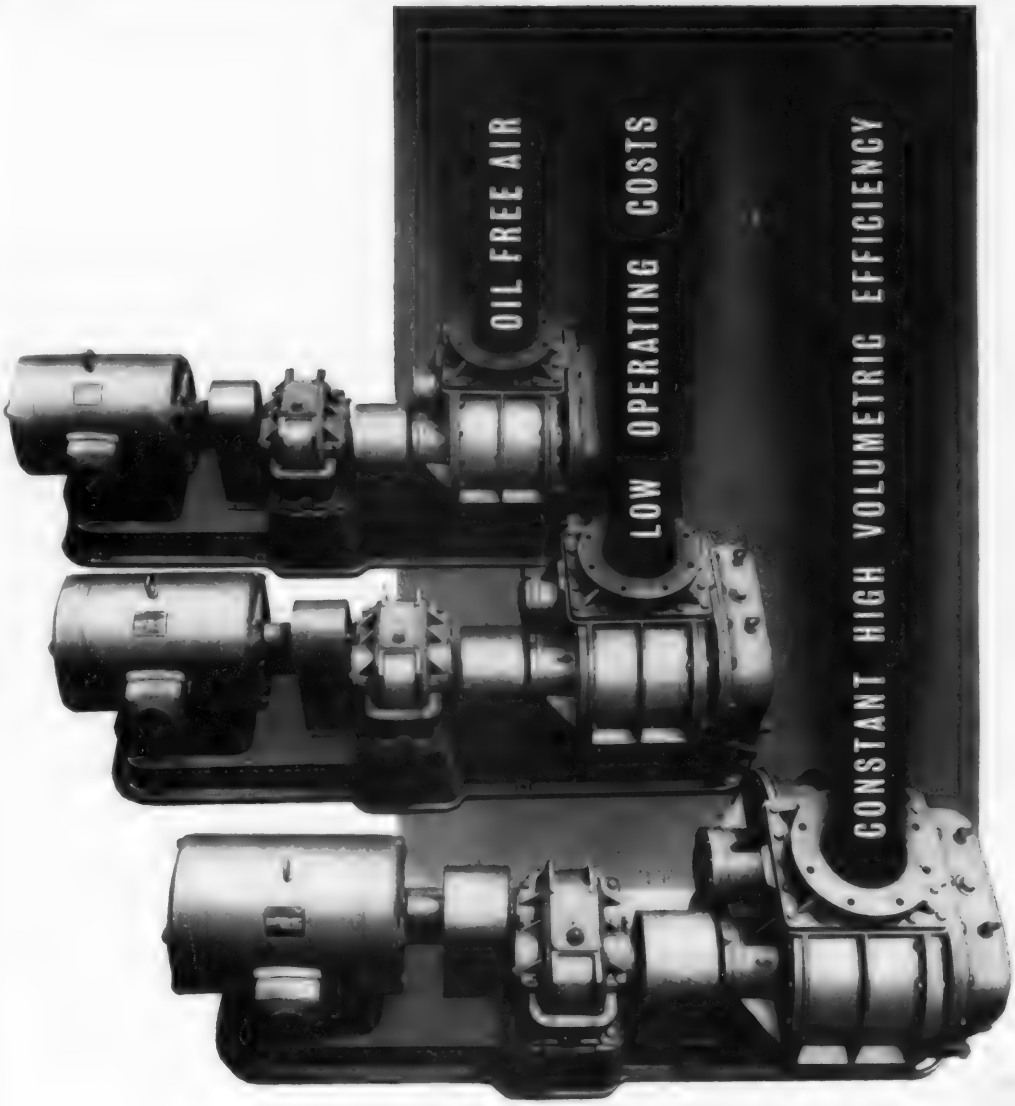

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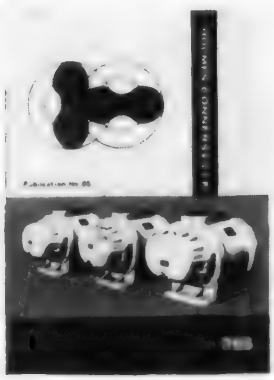

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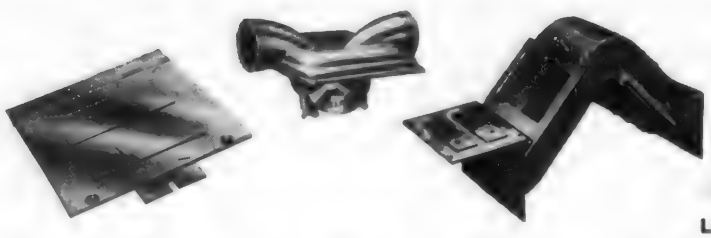

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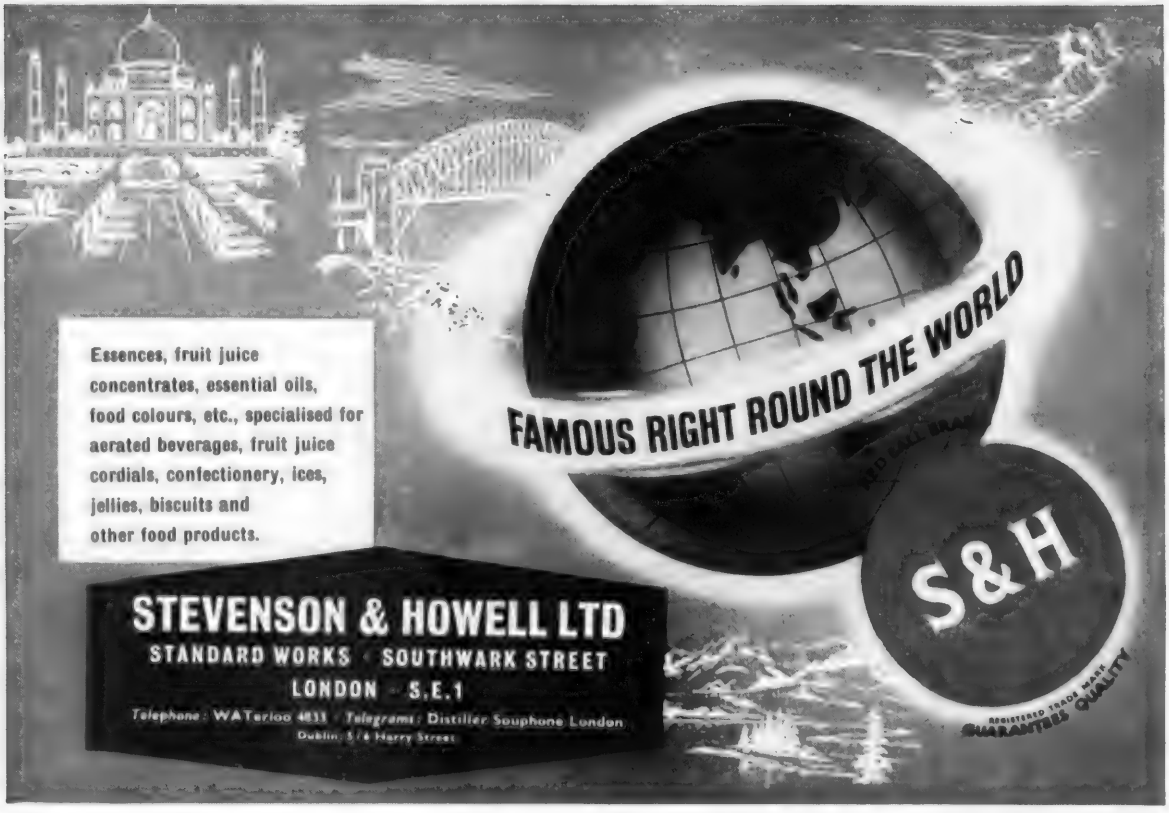
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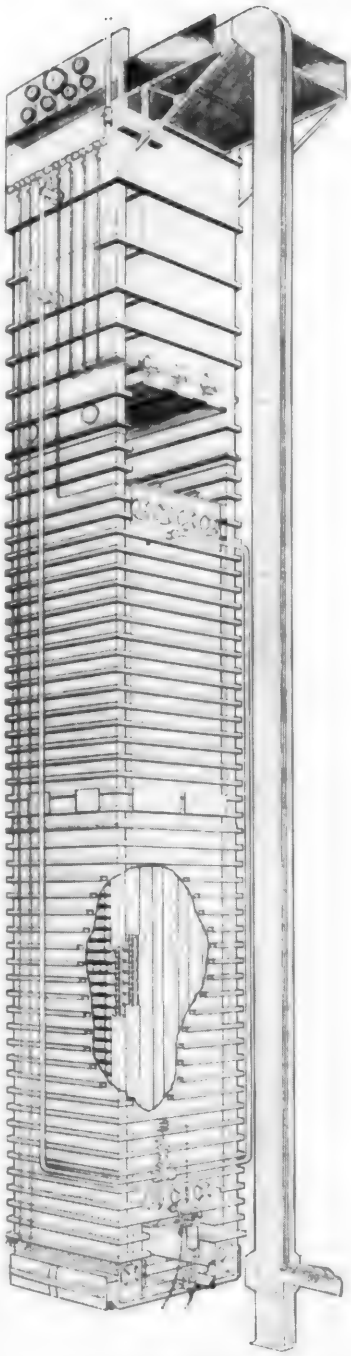

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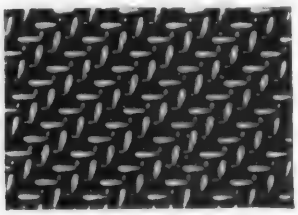

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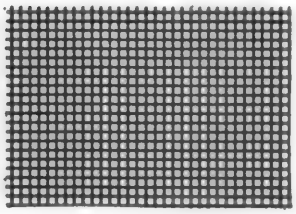

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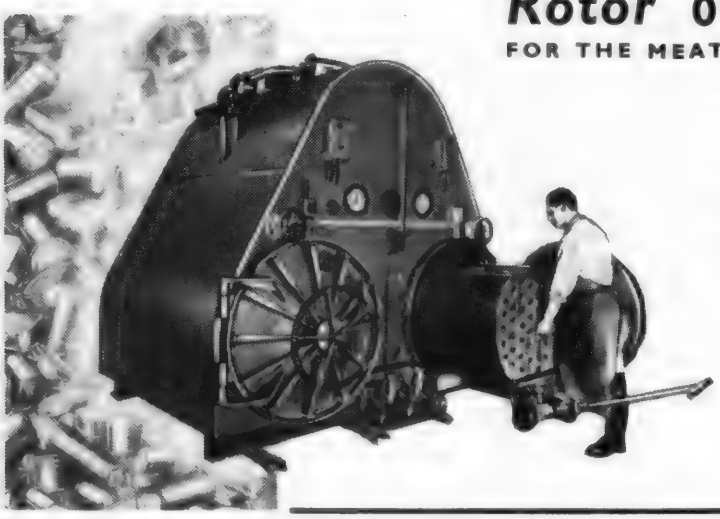

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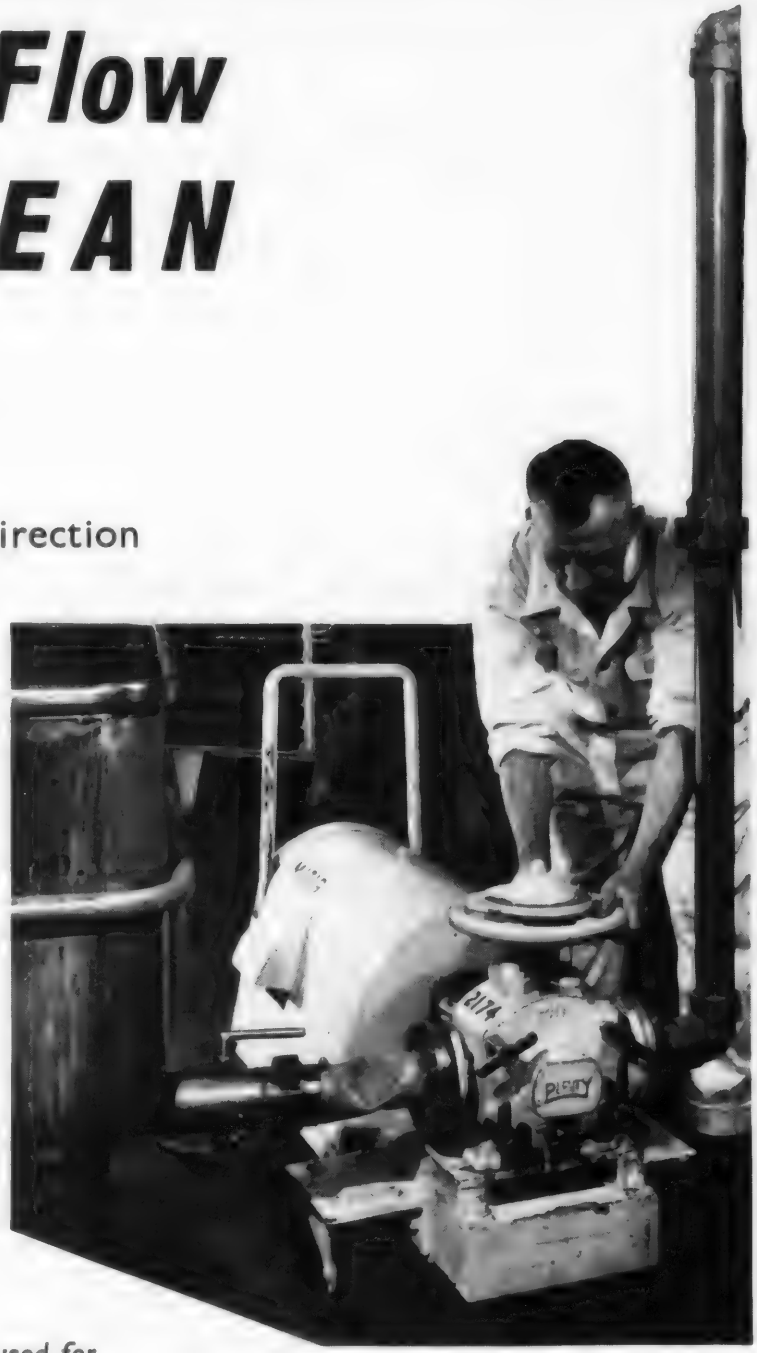

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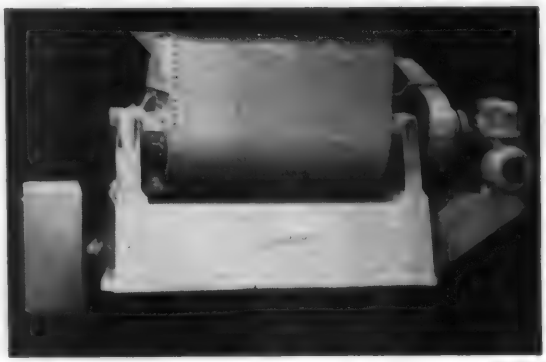

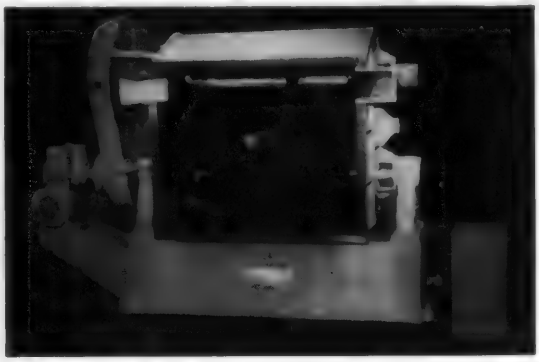

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Volume 36. Number 1 Editor: Anthony Woollen, B.Sc., A.R.C.S., A.R.I.C. January 1, 1961

Editorial	1	Correspondence	27
How the C.W.S. Makes Biscuits	5	National College Welcomes Prince Philip	28
Ice Cream Industry Annual Review *By Eric L. E. Humphriss, A.R.I.C., M.I., Biol.*	10	Advances in Food Technology	29
		Machinery and Equipment	31
Confectionery Industry Annual Review. *By D. R. Felstead, F.R.I.C.*	13	Packaging	34
		News Digest	36
Italian Confectionery Plant	18	Overseas News	40
Using Your Mixer. *By J. Girling, F.Inst.B.B.*	20	People	43
		Recent Patents	44
Tea—what influences quality? *By C. R. Harler*	23	New Companies	44

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A PUBLICATION OF THE LEONARD HILL TECHNICAL GROUP—ENGLAND: LEONARD HILL HOUSE, EDEN ST., LONDON, N.W.1, EUSTON 5911. (Telegrams: LENARDIL, NORWEST, LONDON). UNITED STATES: 2515, BEVERLY BLVD., LOS ANGELES 57, CALIFORNIA, DUNKIRK 1-2241; 681, MARKET STREET, SAN FRANCISCO 5, CALIF., EXBROOK 2-2612; 501 FIFTH AVENUE, ROOM 611, NEW YORK 17, N.Y., YUKON 6-2477; 332, WEST HARRISON STREET, OAK PARK, ILLINOIS, COLUMBUS 1-7906; 1501, EUCLID BUILDING, ROOM 426, CLEVELAND 15, OHIO, TOWER 1-2280; 1214, VILLA DRIVE N.E., ATLANTA. GA., TRINITY 2-2969. ITALY: VIA FILIPPO TURATI 3, (PALAZZO GIARDINO), MILAN. SWEDEN: TUNNELGATE 19B, STOCKHOLM. DENMARK: PALAEGADE 7, 3 SAL. COPENHAGEN-K. NYGAARDSPLADS 8, BRONDBYOSTER, PR VALBY.

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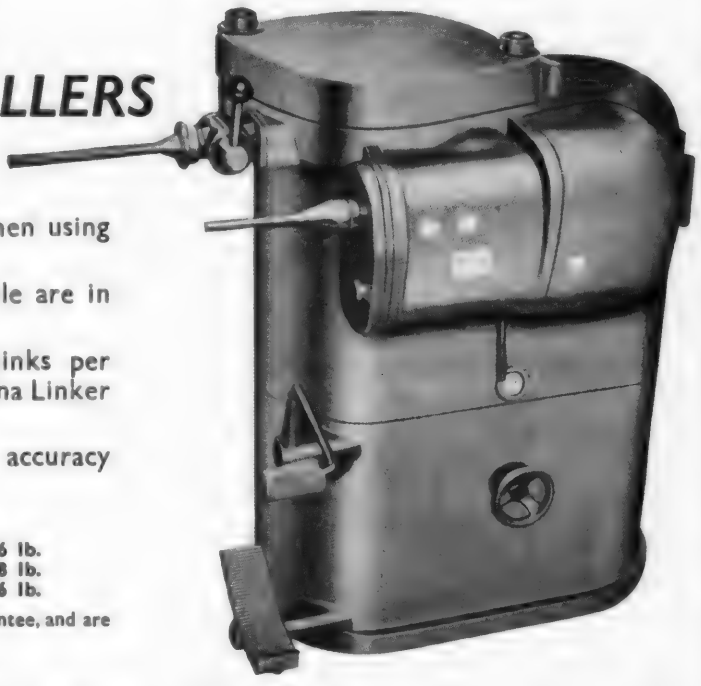

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This advertisement is one of a series of Information Bulletins issued by Loders & Nucoline Ltd. Copies are available, together with a folder, on request to Loders & Nucoline Ltd., Unilever House, London, E.C.4.

POLARINE

Description

Polarine is a highly refined vegetable fat which contains no water and is made especially for the ice-cream industry. It has a completely bland flavour and gives a pronounced smoothness to the ice-cream mix. It is white, tasteless and odourless, and melts very quickly in the mouth without leaving a greasy after-taste on the palate.

Uses

Polarine is an ideal ice-cream fat and is particularly recommended for the manufacture of soft ice cream frozen at point of sale. It is also an excellent fat for ice cream produced on a continuous horizontal freezer.

Polarine has excellent emulsifying properties so that a high overrun can be obtained thereby giving a smooth ice cream with a quick melt down.

TYPICAL PHYSICAL CONSTANTS

Iodine Value	16.5
Sap. Value	244.5
Slip Point	27.5°C.
Complete Fusion	28.5°C.

ICECOA

Description

Icecoa is a refined hydrogenated vegetable fat specially prepared for the production of ice cream. It contains no water and, when melted, is a clear sparkling oil which is very easily dispersed throughout the mix. Icecoa, like Polarine, is white and has no flavour or odour. There is no variation from batch to batch and this ensures that ice cream can be made with absolute consistency.

Uses

Icecoa is the correct fat for ice cream produced on a vertical or horizontal batch freezer and it is also a very good fat for ice cream produced on a continuous horizontal freezer. Icecoa has all the excellent qualities of Polarine but is a harder fat which makes an ice cream that melts less quickly and does not shrink on storage. It is particularly recommended for use in batch freezers because it gives a little more body to the ice cream.

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VEBOL

Description

Vebol is a specially processed pure and bland vegetable fat. It is well refined and is completely tasteless and odourless.

Uses

In Ice Cream

Vebol is a very good fat which shows an economic advantage over other ice-cream fats especially in the production of soft ice cream. It can also be used successfully in other types of freezers.

In Biscuits.

Because of its excellent shortening properties and plasticity, Vebol can be used to advantage in the manufacture of biscuits, either as a component of a fat blend or, where conditions allow, as a complete dough fat.

In Sugar Confectionery.

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TYPICAL PHYSICAL CONSTANTS

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Notes

Although each of the above fats is suitable for ice-cream production, the best results will be achieved if the fat specified for a particular requirement is selected. However, since there is much variation in machinery and manufacturing conditions, you may be in doubt as to which fat to choose. If this is so, or if you have any other problem relating to the application of these fats, please request advice from the Loders Technical Service Department.

LN 73-8058

FOOD Manufacture

Vol. 36, No. 1 January 1, 1961

The bread and flour report

THE Food Standards Committee's report on bread and flour has at last been published, and a very interesting document it is. Its main provisions are published on another page; not unnaturally, the one that has hit the headlines in the popular press is the recommendation on control of advertising claims for high-protein and enriched breads, but other aspects of the contents, although less publicised, are equally pertinent.

The report as a whole forms an excellent treatise on present breadmaking practice and a concise historical summary of the subject. It rightly points out that since bread is the most important staple food, particular care about its ingredients is necessary, and there is everything to be said for clearly stating what ingredients are to be permitted. A large number of ingredients perform various useful functions in the making of bread today, but only very rarely will they all be used at the same time. A permitted list of ingredients, therefore, is bound to be of great length and complexity. The report lays down a list of what ingredients the committee considers should be permitted. It also distinguishes between and proposes definitions for special breads such as "brown," "wholemeal," "malt," etc. With these proposals we entirely agree.

The report deals at length with the question of flour improvers and bleachers. As far as improvers are concerned, it comes to the conclusion that for the present-day commercial production of the bread to which the majority of the public are accustomed, some form of "improver" is a technological necessity, but that further study of physical methods should be undertaken with the ultimate object of rendering chemical improvers unnecessary. We could not agree more.

Regarding bleaching agents, the report states that no technological argument can be adduced in favour of them. In this country for the last fifty years home-milled flour has had to compete with imported flour which undergoes natural bleaching in transit. In this respect it is interesting to compare the practices in different countries regarding the use of flour bleachers and improvers.

In this country the most commonly used agents are chlorine dioxide, potassium bromate, ammonium or potassium persulphate, benzoyl peroxide, and to a limited extent oxides of nitrogen. In Canada and the U.S.A. certain substances, including some of those used in Britain, are permitted, but treatment must be declared. Belgium, France, Western Germany and Italy do not in general permit the addition of any chemical substance for bleaching or improving flour, for reasons mainly concerned, it seems, with considerations of public health. Regarding the colour desired, public taste in the various countries differs. Whereas in Britain and the U.S.A. the public rather naïvely associates whiteness with quality, on the Continent, and especially in France, bread traditionally has the natural colour of wheat flour and the public would regard an accentuated whiteness as abnormal.

Should prepacked food be date-stamped?

ONE of the speakers at the Pure Food Centenary Congress was asked whether or not he considered that prepacked food should be marked for the consumer's benefit with the date of manufacture. His terse reply left no doubt that he thought the suggestion absurd; he did not even bother to explain why.

Code-dating, of course, is an established and necessary procedure, and on the face of it the clamour by various protagonists of the consumer for the date of manufacture to be plainly marked may seem not only feasible but entirely reasonable. Surely, one may say, the only reason for not dating goods is to shield the wholesaler or retailer who may be left with unsaleable stock on his hands.

But the matter is not quite so simple. Firstly, although the law does not require articles of food or drink to be marked with the date of manufacture or the date before which they should be sold, it does place full responsibility for seeing that the articles comply with the law in regard to weight and quality on the person who sells them or has them in his possession for sale. If such articles do not comply, he will not be prosecuted if he can prove that he took reasonable care and precaution. One may say that this can be achieved by dealing with a reputable sup-

plier, by carefully examining and checking goods received, by not over-stocking, by selling stock in strict rotation, and by regularly checking scales.

Secondly, if the idea of dating is to establish a useful life, what is the useful life of a food? This depends to a large extent on storage conditions, over which, once the food has left the factory, the manufacturer has no control. Bad storage conditions could often make a date mark not only useless but even misleading, and would tend to shift responsibility for errors from the seller to the manufacturer.

It has been suggested that if compulsory date-marking were instituted, manufacturers might try to extend shelf-life by the increasing use of antioxidants, preservatives and anti-staling agents, thereby making the unfortunate public analyst's life even harder.

Although much can be said in favour of compulsory dating (and some manufacturers do, indeed, voluntarily date their products), its operation in practice would be difficult and complex. For example, some way over the storage problem would have to be found, and how could the date-marking of imported goods be controlled?

We already have enough food legislation (too much, say some), and it may well be that the existing processes of competition, the increase in public awareness of food quality, and the capable administration of present legislation already does all that a system of date-marking could be expected to do.

Covent Garden to be streamlined—how?

So THE Government proposes to set up a public authority to run Covent Garden Market. The authority will be "charged with the duty of concentrating the market and improving the facilities," and will be required to take "all possible steps" to relieve the present serious traffic congestion. It will be assisted by three committees—a committee of producers and traders to help run the market, a committee of "traffic experts" to advise on traffic problems, and a committee of workers' representatives to advise on labour problems.

All this is the familiar mixture prescribed by bureaucracy. The most fundamental decision of all, that the market should remain where it is, was foreshadowed by the Runciman committee's report, but there are good reasons why this decision should not be made. The market has grown up where it is because in the Middle Ages it was a public open square where people gathered to buy and sell market produce. Charles II in 1670 gave the Earl of Bedford a charter to hold a market in the square at Covent Garden, and in 1828 an Act was passed enabling the market to be improved and stipulating how the market was to be laid out. The market is still run in accordance with the 1828 Act; as Mr. Soames so rightly said, it was "laid out in the days of horse and buggy, and the present congestion is so great that it is almost a miracle that the market functions at all."

From bitter experience we doubt whether a public authority could run anything as efficiently as a private enterprise could, and as for traffic problems being solved by a committee of experts—ha! ha! The sensible and logical thing would be to remove the market away from the heart of London; we understand that a proposal to rebuild the market over railway sidings north of King's Cross, which seems reasonable at first sight and in keeping with the Government's policy of helping the railways, was not even considered.

If the Bill is passed, a great opportunity to make a start on the problem of relieving London's mounting blood pressure will have been sadly missed.

Human engineering

WHAT IS this thing ergonomics that we hear so much about these days? The current splurges on the subject might give the impression that it is new, but our opinion for what it is worth is that ergonomics is but common-sense writ large. "Ergonomics is in its infancy," declares Viscount Hailsham. "With the new machinery of today, it is often the human operator who is the limiting factor as he finds that his complex and exacting tasks, the speed of the work, or the unremitting vigilance required, impose too great a strain, or lead to costly error." Tripe. The whole point about the new machinery is that it makes the operator's task more easy, not less. It is the bosses who labour under increasing strain, not the workers.

Certainly "the man must be considered with his machine," and if you want to summon conferences and talk weightily about ergonomics by all means do so. But jolly get-togethers of "designers, engineers, physiologists, anatomists and experimental psychologists" to deal with such problems as "the design of equipment, the layout of instruments, the display and control of machines, and the effects of environment on performance" (we are quoting *Target*, the bulletin of the British Productivity Council) are likely to impress nobody but the participants unless someone brings forth some really startling new ideas. The various worlds of the experts are too separate, the terms of reference too vague.

What does an anatomist know about a computer? If a machine manufacturer cannot provide a proper chair without having a team of experts with impres-

sive qualifications to advise him it is a poor show. The best advice, we should imagine, could be obtained from Bert, the fellow who works the machine.

Ergonomics are all very well provided it is realised that man does not "fit in" to a world populated by machines. The man is above the machine in the same way that a craftsman is above his chisel, or an engineer above his slide-rule. And what is the most complex electronic "brain" ever devised but a glorified slide-rule?

Future cows in Russia

A COLLEAGUE of ours visited Russia recently. He was told by the manager of a collective farm that they had on the farm 180 cows. "But," he added, "some of them are future cows." It turned out that he was referring not to the seven year plan but merely to calves.

Conditions on this farm seem to have been typified by a newly-built, two-family house with about two rooms for each family. The only water came from an irrigation pipe in the garden, and the only cooking appliance (on a veranda) was worked by methylated spirit. The stock reply to criticisms, however, is how much worse it was in the past and how much better it will be at the end of the seven year plan.

Future cows, in fact.

Who says Britain is getting cleaner?

STATISTICS recently issued by the Ministry of Health show that food poisoning continues to increase. The number of incidents reported in 1959 was 7,846, 546 more than in the previous year and the highest figure for any year since 1939 with the exception of 1955. At least 17,500 people were affected, probably far more, and 27 people died.

These figures give no ground for a complacent assumption that Britain is becoming a cleaner place. The chief villain is undoubtedly the caterer, a supposition reinforced by the striking parallelism between the steep rise over the years both in food poisoning incidents and the number of licensed catering establishments. Three-quarters of the outbreaks traced to a specific food were caused by processed, made-up and reheated meat and meat pies. The pernicious practice of reheating cooked meat continues to be widespread in spite of vigorous counter-propaganda.

The evidence overwhelmingly points to the fact that contamination occurs during handling at the receiving end rather than during processing. Food manufacturers may take consolation in the Ministry's report that fresh meat and fish cooked and eaten when hot, fresh vegetables and fruits, pasteurised milk and canned foods of all kinds are seldom implicated in food poisoning.

"The problem of contamination of meat," says the report, "would require more study by veterinarians and medical men before effective control measures could be taken," a rather ponderous way of disguising the fact that little can be done about food handlers who will not wash their hands after visiting the toilet, who stick dirty skewers into hygienically wrapped pies, and who keep meat dishes for hours at optimum incubating temperature. The efforts of the recently formed National Hygiene Council to achieve a cleaner and healthier Britain have our ardent support.

Metred calories

SWEEPING the U.S.A. is the metred calorie craze, the consumption of complete canned meals containing essential protein, carbohydrate, fat, minerals and vitamins, but limited in their calorie content to an amount guaranteed, it is claimed, to take pounds off the obese provided the directions are closely followed. Business speculators are naturally cashing in on the soaring share values of the many companies entering the market, but some are wondering how long the craze will last. We would not be surprised if some people lose more £'s than lb's.

Changing from a normal diet to one consisting of a daily glassful of enriched milk powder and water seems a little hard on the human constitution. What about roughage? The more reputable makers point out that such diets should only be used under medical supervision, a statement recently endorsed by the American Medical Association. That such diets are capable of taking off pounds of superfluous flesh has been proved, but the essential ingredient for success, which cannot be bought with the can, is the will to persevere. If the will is there, why buy a dollar's worth of slimming food when the same result can be achieved for 40 cents by cutting down on those foods which tend to cause overweight?

In an age when two-thirds of the world's population is underfed, preoccupation with one's weight is a curious phenomenon among the glutted better-off. Fashions of normality change from one generation to the next; the examples of female beauty of a few generations ago would today be considered buxom, yet who looks more radiantly healthy, a plump country wench with rosy cheeks or the type of gaunt, bony femininity paraded in hideous postures on posters, in fashion pages and on cinema screens, and emulated *ad nauseam* by impressionable teenagers who starve themselves to preserve their "vital statistics?"

Boxes bigger than they should be—II

"A CHRISTMAS racket," shouts the National Union of Small Shopkeepers about a two-and-sixpenny box of chocolates which, the Union alleges, according to a report in the *Daily Telegraph*, contains only one-and-elevenpence worth of chocs. "The cost of the flimsy box can't be worth more than a penny," claims Mr. Thomas Lynch, the Union's president. "Nonsense," say the makers, who, while admitting that the chocs. are worth only about 2s., point out that the extra 6d. is accounted for by the cost of the box itself, the attractive colour printing on it, and the additional labour needed for packaging.

We can well believe it. In a comment under the above heading in our issue for November, 1959, p. 414, we drew attention to the extravagance of some Christmas sweet packs and the small proportion of the total volume occupied by the cargo space. Now we have not seen the pack in question and we do not therefore take sides in the present dispute. We merely point out what should be obvious, that the more elaborate the container the more it costs, and it costs much more than a penny. The customer, of course, pays, and if he buys the pack it is his affair.

Presumably manufacturers find that people buy such packs otherwise they would not make them. Pack designers and sales managers have the delicate task of deciding how far they can go in the matter of elaboration to reach the point where the goodwill curve becomes negative. Christmas packs are more often than not bought as presents. The purchaser may be well content at having bought, so he imagines, a worth-while gift; the consumer who finds how many chocs. he has actually got may be disillusioned, and some manufacturer's goodwill is lessened. But marketing, as everyone knows, is based largely on charging what the market will bear. Truly a delicate matter.

The good old days!

LONG ago when we were kids we used to eat delicious confections which now, alas! seem to have disappeared from the market. Such things as gob-stoppers, which changed colour (they cost a farthing each and lasted for hours—what fun it was to see what colour they had turned after a few minutes' sucking) and toffee apples (how revoltingly sticky, but how scrumptious!). Sherbet, too, in those triangular packets with a tube of liquorice to suck it up; how deliciously it frothed in the mouth!

In those days we thought little of permitted colours; no doubt the entrancing colours of the gob-stoppers would be "non-permitted" today; toffee apples, too, probably collected bugs as efficiently as a fly-paper collects flies. But we survived it all. Today's children, educated by the telly, are more sophisticated in their tastes; modern manufacturers are more concerned that sweets are hygienically wrapped. It must be so; progress, alas! causes casualties. Nowadays we even worry about the printing ink on the outside wrapping. Perhaps to our children some of today's practices may seem quaint.

The ultimate in labour-saving?

IT HAD to come. Father's only contribution to the preparation of the family meal, his traditional carving of the Sunday joint, has now been mechanised. We learn from the *Financial Times* that a power-driven carving knife has now appeared in the U.S.A. "A rather bulky handle encloses two torch batteries and a motor to reciprocate the knife blade. The user holds the handle firmly and presses down, the blade moving to and fro in a saw-like movement." Is nothing sacred?

Poison on your plate?

WRITING in *Reynolds News* under this scare headline, Merry Archard reports on an interview which she has had with a Mr. Donald Wilson, secretary of the Organic Food Society, which, it is stated, was specially formed only a few months ago to sponsor a food shop, "Wholefood," in Baker Street, London. As if to give added weight, it is mentioned that Mr. Yehudi Menuhin, the famous violinist, and Earl Kitchener are among the seven council members. What any of them know about human nutrition is anybody's guess!

Mr. Wilson is quoted as saying: 'We are terrified of what the scientists are doing with our food . . . I think that if we go on eating food impregnated with chemicals we shall be sterile in three generations."

Have we ever seen Britain's children looking more bonny? Have her people ever been so well fed? Have they ever lived so long and multiplied so fast as they do in these perilous times, when it is more dangerous to cross the street than to eat a fertiliser-fed, chemical-impregnated lettuce, reeking of fumigants, fungicides and insecticides, etc.?

The grain eaters of America, the rice eaters of the East, the tea, coffee and cocoa drinkers and the fruit eaters of the world need not worry unduly. Let us leave it to the food cranks to worry themselves into an early grave.

How Swiss Rolls are made. The dough, which has been coated with jam or cream and then cut into pieces (*background*) is rolled by hand as shown and placed on the upper conveyor for transfer to the wrapping section.

How the C.W.S. makes Biscuits

Crumpsall factory turns out 260 tons per week

Last month we described the Reading preserve works of the C.W.S. This month we turn to another section of the Society's vast manufacturing enterprises, and describe biscuit manufacture at Crumpsall in Manchester, founded in 1873 and the very first of the C.W.S. factories to be established, which we recently visited.

THE Crumpsall biscuit factory of the C.W.S. has a claim to history by being the first factory to be operated by the Society. It was in February, 1873, that a privately-owned factory there was taken over as a going concern. No record of its previous owners exists, but together with the church it can be said to have been the life of the village, for it employed nearly all the local working population. It now employs about 1,000 people, three-quarters of whom are women. This number is increased by casual labour during seasonal busy periods such as Christmas.

Some of the original factory still exists, but the works have of course been modernised and extended since its foundation, and it would be hard to say where the original buildings left off and the new began. Inside the factory there is very little sign of its length of years, for the equipment is in general as modern and up-to-date as can be found anywhere. The two bakeries in particular have continuous biscuit-making machinery very recently installed, (one bakery was re-equipped early last year) and the buildings are light, airy and spacious in a manner not at all to be expected in a factory so long established.

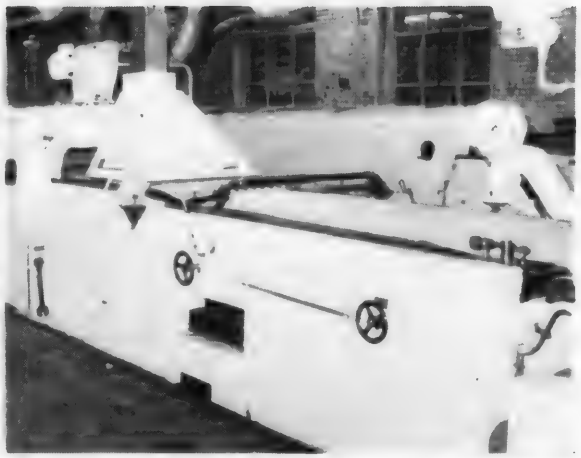
The factory is one of three operated by the Society, the others being at Cardiff and Harlow. (The last, the most modern of the three, was described in our issue for December, 1958, p. 512.) It manufactures about half the total quantity of biscuits made in the Society's factories, and supplies an area of the country north of a line drawn approximately east and west through the Wash, as far as the Scottish border. The three factories operate independently, in contrast to the running of the four C.W.S. preserve works, which as explained last month, is controlled by a group manager.

About 50 lines are made at the factory, much less than before the war, when about 200 were made. The best seller is *Cream Crackers*, which accounts for about 27% of the production, followed by ginger biscuits. Besides the two biscuit bakeries there are a Swiss roll plant and a marshmallow plant. Total factory output per week is about 260 tons on an average.

The Society's factories have different marketing problems to face than independent firms, for whereas the member societies of the C.W.S. can purchase what brands they like, whether manufactured by C.W.S. factories or not, the factories themselves can only sell to member societies. They thus have to compete with other firms without having the power to sell where they like.

The bakeries

There are two bakeries, one having six gas-fired baking ovens and the other four. The latter contains two identical plants for producing cream crackers. The mixing room of the bakery containing the four ovens is on the



(*Left*): **Showing how the dough " scrap " is returned to the dough hopper while the cut biscuits pass on.** (*Right*): **Fig bars emerging from the baking oven.**

floor above, which allows the mixed dough to be gravity fed to the baking plants, but the mixing for the other bakery has to be done on the same floor as the baking plant, so that the dough has to be lifted manually from the mixing pans into the dough dividers. The reason for this is that the floor above the second bakery is used for labelling, packing and wrapping.

Cracker production

For crackers, dough is mixed, fermented and baked down to the very low moisture content of 2%. Mixing is carried out with the aid of two high-speed or four vertical mixers, each being of 2-sack capacity. The high-speed mixers are of the Baker Perkins type with a tilting bowl which, when mixing is finished, tips the mixer contents into a trolley container positioned alongside. The vertical machines mix the dough in specially shaped trolley-mounted mixing containers.

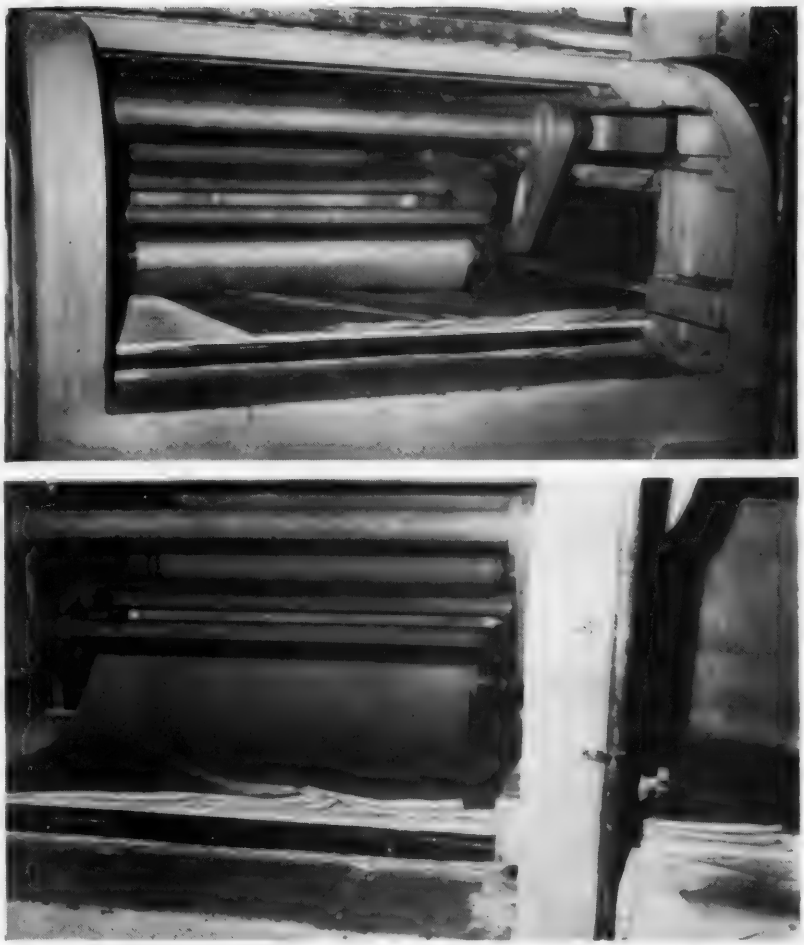
When mixing is complete the containers are wheeled into air-conditioned fermenting rooms where the dough is allowed to ferment for 2 hours. When the dough is ready for baking, the containers are wheeled out and tipped into the feed hoppers of the two baking plants on the baking floor below.

Ingredients for the mixes are weighed out on the mixing floor, with the exception of chemicals and essences which are weighed out in a separate mixing room.

This worker is loading the flour and fat mixture into the hopper of the device which spreads it on the lower of the two sheets of dough which are then sandwiched before lamination.

At the present time, flour and sugar are handled in bag form, but plans are in hand for installing a bulk handling plant for these commodities, as well as for salt.

The operation of the two cracker plants is identical, and one description covers both. From the feed hoppers the cracker dough passes to a dividing machine which divides the dough stream into two equal sheets, an upper and a lower. To the facing surfaces of the sheets are continuously applied a fat and flour mix which has been prepared in the mixing room above and fed to the dividing machine via a separate



The method of laminating dough for the manufacture of cream crackers is explained in these pictures. A thin sheet of dough is laid on a moving belt by a spreader which moves back and forth at right angles to the conveyor. In the top picture the spreader is advancing towards the camera and in the other it is going back.

hopper. The two sheets are then brought together and pressed, forming a sandwich with the fat/flour filling in the middle.

The combined sheet then passes successively through three sets of thicknessing rollers, which reduce the sheet to a very thin section. The sheet then passes through the laminating machine. The sheet is fed by means of a belt conveyor oscillating to and fro on to another belt conveyor underneath which is moving at right angles. The action of the oscillating conveyor is to lay the thin sheet of dough in alternate folds on the conveyor beneath, much as textile material drawn off a roll and folded on a flat surface; as the lower conveyor, however, is moving slowly at right angles, each fold is not superimposed exactly on the one beneath but shifted slightly so that by the time five folds have been laid the conveyor has moved through a distance equal to the width of the sheet. At any point on the lower conveyor, therefore, there are five thicknesses of dough sheet on top of one another. This laminating machine was first developed for Jacobs, and the C.W.S. are the first manufacturers after Jacobs to instal this type of machine.

This laminated sheet now passes through a further three sets of thicknessing rollers before arriving at the dough cutter, which cuts out and stamps the biscuit blanks at the rate of 1,600 per minute in rows of 18; the scrap material is returned in the usual way by overhead conveyor to the dough divider for reworking.

The biscuits now go through the baking oven, which is a gas-fired straight-through oven 225 ft. long. On emerging from this the crackers are automatically transferred to a cooling conveyor which doubles back over the oven and then travels upstairs to the wrapping department on the third floor.

Fig bars

A popular line which is made in this bakery is *Fig Bars*, made on one of the remaining two production lines. The dough is mixed in the mixing room as for crackers and fed to an extruding plant. A peculiarity of the plant is the method of forming the filled bar. There are two extruders each comprising a number of extruding dies which have an inner and an outer orifice. Dough is pressure-fed to the outer orifices of the extruding set and the fig filling to the inner. The result is a series of extruding tubes of dough filled with fig filling, which then pass to the cutting machine to be cut into small pieces and then to the baking oven. We were told that there are two schools of thought in connection with the manufacture of this product; one holds that cutting should be done before baking and the other after. In this factory, cutting is carried out before baking.

The other bakery has six production lines arranged side by side in parallel, each with its own oven. As previously explained, the building is so built that mixing has to be done on the same floor; this mixing room, like the other, has two high-speed mixers and several vertical mixing machines, and the container trolleys are wheeled from the mixers to the required production line and the dough transferred manually to the dividers.

The arbiters of biscuit quality are the plant operator who sets the machines to give a stated number of biscuits per $\frac{1}{2}$ lb. before baking, and the oven operator who sets the oven to produce a stated number of baked biscuits per $\frac{1}{2}$ lb. These standards, which are set for each biscuit by the production manager and by the technical department,

(*Left*): **Biscuits are shown coming up by conveyor from the bakery on the floor below to the wrapping section.** (*Right*): **A depositing machine for the manufacture of cream biscuits.**

must be right both at the machine end and at the oven end.

Biscuit wrapping and packing

The wrapping, packing and labelling floor is on the third floor above the second bakery. This, as previously explained, accounts for the fact that the mixing floor of this bakery is on the same level as the baking floor.

For wrapping *Cream Crackers* there are three SIG wrapping machines. Biscuits are transferred manually from the conveyors from the two cracker production plants, two of the machines being fed directly from the conveyors and the third by cross conveyors from the other two. Each machine wraps in two separate operations. First, two half boxes of corrugated paper are formed, into which the biscuits are packed; this inner carton is then overwrapped with lacquered laminated paper which is heat-sealed at the ends.

From the wrapping machines the cartons fall by gravity on to a moving conveyor which takes them to the packing section where they are packed by hand into tins. At this point there was an object lesson in the genius sometimes exhibited by the factory operative. As the cartons fall from the wrapping machines they land on the conveyor with their long axes in the direction of the conveyor's motion. So that the workers in the packing section can quickly take up the cartons and transfer them to the tins with a minimum of effort, it is necessary to turn the cartons at right angles. This problem was neatly and effectively solved by the simplest of devices, a projecting block of wood trimmed with sponge rubber and fixed by one of the operators to the side of the conveyor housing. As the cartons pass along their ends encounter the piece of wood and they are swung round exactly at right angles with a precision and reliability which could not be bettered by the most elaborate mechanism.

Washed biscuit tins come from the washing plant (which is situated outside in a separate building) through a closed tunnel conveyor containing a supplementary air dryer. They are fed to the packing sections by overhead conveyors from which they are taken by hand as required.

Handling of tins

Tin labelling is also carried out on this floor. Labelling is performed by a battery of *Swift* labelling machines, and to assist the movement of filled tins to and from the labellers, a series of overhead endless conveyor chains with suspended carriers on which the tins can be placed move continuously between the packing, labelling and storage sections.

Although a large proportion of the factory's output is still sent to retailers in tins, tin usage is declining with the ascendancy of the wrapped carton, although many are used for internal purposes in the factory. Present usage of tins is about 40,000 per week.

When empty tins come into the factory, they are transferred from the lorries to the basement receiving section down two chutes. The lining paper is removed, baled and sold as salvage, while the tins go to the tin washing and sterilising plant which is situated in a separate building. The washed tins then go to the third flood packing section up the tunnel drying conveyor as previously described.

Marshmallow plant

The marshmallow plant is situated in one long room and is laid out in straight line form with the ingredient storage and mixing arrangements at one end and the wrapping and packing section at the other.

The plant turns out about 1 million pieces per week. Three varieties of marshmallow are made: standard, an American tea-cake with coconut added to the filling, and a "mallowette".

Chocolate is made at the English and Scottish C.W.S. factory at Luton and transported to Crumpsall in road tankers. It is stored in two stainless steel tanks

The Swiss Roll plant. (*Left*): **Swiss Rolls being fed to the wrapping machine.** (*Right*): **Another view of the wrapping and cartoning section, with the rolling section in the background.**

holding 7 tons each. When required, it is drawn off, heated in a chocolate kettle, and recirculated through a tempering machine and the enrober

The mallow filling consists essentially of a mixture of invert sugar (made at the C.W.S. sugar confectionery works at Reddish), glucose and gelatine. The sugar and glucose are metered into a heating vessel and the gelatine added. The mixture is then pumped to a 500 gall. stainless steel holding tank, from which it is drawn as required, aerated in two pressure whisks and pumped to the hopper of the depositing machine.

The biscuit bases are made separately in one of the bakeries and brought over. They are transferred by hand to the feed mechanism of the depositor, and fed in rows of a dozen at a time at the rate of 40 per min. under the orifices of the depositor, which apply a regulated amount of filling on to each base. As the mallows in the making leave the orifices on a belt conveyor, the "tails" of filling are flattened by a roller under which they pass.

At this point, coconut is put on during the manufacture of teacakes.

The next stage in the process is known as "skinning". As the name implies, the surface of the filling is hardened slightly in a drying tunnel, tiered to save space, which is fed with conditioned air. On emerging from this the items go through the enrober for coating with chocolate, then to a tiered cooler in which a 150 ft. length of cooling conveyor is enclosed by tiering in a cabinet of modest size. From the cooler the finished marshmallows go straight to three Sapal wrapping machines to be wrapped in foil.

Swiss roll plant

The heart of this plant is an Oakes continuous mixer which mixes the batter at a rate which is adjusted according to the required speed of the plant, itself a function of demand.

Main ingredients such as flour, eggs, sugar and invert sugar are weighed on scales and pre-mixed in a mixing vessel. This pre-mixing is not essential for the operation of the Oakes mixer, but the vessel serves as a convenient holding tank. From the continuous mixer the material is pumped to a depositor which lays the batter in two parallel strips side by side on an endless steel band conveyor which goes right through the gas-fired baking oven and out at the other end. On emerging from the oven the cooked material has the golden-brown raised appearance characteristic of Swiss rolls.

The two strips of material are removed from the steel band conveyor by a doctor blade and transferred to a cooling conveyor which doubles back on itself and goes underneath back the way it came, so that from here on the material is travelling back towards the oven, underneath the first part of the cooling conveyor which is made to rise to provide room. Thus space is saved. From the cooling conveyor the material passes successively to a sugar dusting machine, two depositors (one for cream and the other for jam), a cutting machine which cuts the material into short lengths, and then to the rolling section.

The actual rolling is done by hand and is one of those operations which looks deceptively simple but is probably skilful; as the cut sections pass women grouped on either side of the conveyor they are rolled in one quick movement and transferred to a conveyor feeding a wrapping machine which wraps each item in *Cellophane*.

Chocolate department

Chocolate-coated biscuits are made in this department on a production line which comprises enrobing, cooling and packing sections, the biscuits themselves being made in the bakeries.

Other lines made in this department are cream biscuits and jam biscuits. There is also a wafer-making plant comprising mixing and depositing sections (the wafer batter being deposited on a steel-

(*Concluded on page 17*)

ICE CREAM Industry
ANNUAL REVIEW

By Eric L. E. Humphriss, A.R.I.C., M.I.Biol.

The trend today is towards continuous production, says the author in this review of recent technological developments in the ice cream industry. In little more than a decade the status of ice cream has risen from that of a suspected cause of much food poisoning to that of a first-class product produced under the highest possible standards of hygiene.

THE difficulty confronting anyone attempting an annual review of the ice cream industry is well exemplified by Rothwell.[1] In an article entitled "Recent Ice Cream Research, 1954-59," he expresses surprise at the paucity of published research work on ice cream. He goes on to hazard a guess that this may well be due to the fact that much of the work carried out is done by organisations having a commercial interest in the industry, and is therefore not published. The present writer would go even further and reiterate again, that most of the work available for review is of American origin; some considerable bulk of this appears to be in some measure repetitive.

In support of this latter contention one may cite two papers referred to by Rothwell. The first refers to microscopic methods applied to the study of frozen ice cream; the second to the destruction of what, twenty-five years ago, used to be referred to as "apparent" viscosity of mix, by agitation. Nothing new seems to have emerged from these two studies.

Rothwell's excellent review should, of course, be read by all interested in ice cream. It covers well over one hundred references and includes a most useful and informative table of ice cream standards at present in force in no less than twenty different countries, from Japan to Eire.

The flow of publications from the U.S.A. is, of course, mainly due to the fact that there are, in America, numerous State agricultural colleges and research institutions where investigational work is carried on, and where publication thereof is naturally uninhibited.

Not all repetitive work emanates from America. O. F. Hansen,[2] 1959, discusses the advantages of neutralising over-acid ice cream mixes, and points out the even greater desirability of avoiding the necessity for neutralisation by using only first-class ingredients in the mix. All this was realised and set down in print thirty years ago and is still "in the textbooks," so that one sees little point in republishing such axiomatic matter.

(*Above*): **Freezing and extrusion of ice cream at Lyons' Bridge Park factory.**

Incorporation of maize syrup solids

In view of the revived interest in the incorporation of maize starch hydrolysates in mix, the papers of H. B. Young and L. E. Mull[3] and of P. G. Keeney and D. V. Josephson[4] are of considerable interest. These workers concluded that the glucose syrups with the lowest dextrose equivalents exerted the greatest effect in improving body and texture, and afforded the greatest protection against heat shock with its consequent texture deterioration. Dextrose itself apparently gave the least protection.

Since, by definition, the dex-

trose equivalent (D.E.) of a "glucose syrup" is the quantity of reducing sugars present, calculated as dextrose, and expressed as a percentage of the total solids or dry matter of the syrup, the D.E. is an index of the degree of hydrolysis of the commodity. It would seem, therefore, that the virtues of glucose syrup in so far as texture protection and improvement are concerned reside mainly in the dextrins.

A low D.E. (low conversion) liquid glucose may contain on a solids basis some 45% dextrins, whereas an acid cum enzyme hydrolysed syrup may well contain little more than one-quarter (12%) dextrins. It would be interesting to compare the texture enhancing effects of low D.E. glucose syrups in parallel with those of other hydrophilic colloids known to exert a stabilising effect in mix.

L. K. Crowe[5] reported amongst other things, another aspect of this inclusion of maize syrup solids in ice cream. According to him, sucrose was preferred as the mix sweetener, although he found small amounts of cornstarch hydrolysates could be incorporated without evoking adverse comment from the consumer. Crowe also found that dried whey could be successfully used as a mix ingredient, a discovery forced by circumstances on the British ice cream industry in the late 1940's.

Thawing and re-freezing of stored ice cream

J. L. Barnhart[6] claims that ice cream mix made in the "flush" period (April, May, and June) can be frozen and so stored for subsequent thawing out and refreezing as required to yield a high quality ice cream. This could well find some application here in view of the increasing popularity of dairy ice cream; the idea merits the attention of the Milk Marketing Board, as well as of ice cream manufacturers.

Rose M. Pangborn *et al.*[7] tested the acceptability of various sucrose sweetness levels in strawberry ice cream, and concluded that 19·2% sugar was optimum.

Mix flavour costing

D. J. Limpert[8] has evolved an expression for accurate mix flavour costing:

$$\text{cost/gal. ice cream} = \frac{(\text{cost of flavour} + \text{cost of mix}) \times \text{wt. of mix per gal.}}{(\text{wt. of flavour} + \text{wt. of mix}) \times (1 \text{ plus overrun})}$$

Stabilisers and emulsifiers

Several patents have recently been taken out covering the use of "new" stabilisers and emulsifying agents in ice cream. An example of the former is provided for in the use of water soluble amides of alginic acid as protective colloids in mix;[9] of the latter, by the claim for the use of edible, unsubstituted, monoalkyl, glucoside-fatty acid ester in ice cream.[10]

It may be of interest to record that the U.S. Food and Drug Administration[12] have recently (1960) allowed the use of polyoxyethylene sorbitan tristearate and polyoxyethylene sorbitan mono-oleate in frozen confections, including ice cream, up to a maximum of 1,000 p.p.m. in the finished product.

Domestic unit

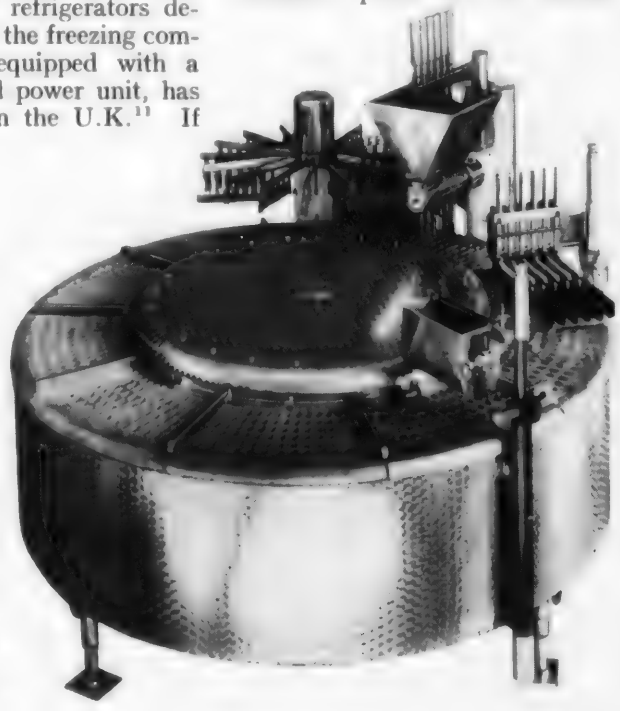
An ice cream making unit for use in domestic refrigerators designed to fit into the freezing compartment and equipped with a stirring arm and power unit, has been patented in the U.K.[11] If this idea proves workable and catches on, it might well create a demand for liquid mix, delivered in, say, pint containers along with the milk, or alternatively for packaged dehydrated ice cream mix (powder) available from the family grocer.

Bacteriological standards

Several bacteriological studies have been published during the past year or so. None have revealed anything really novel or revolutionary in so far as their application to ice cream technology is concerned. It is not without interest to note from Rothwell's tabular summary of Statutory requirements in regard to the bacteriological quality of ice cream the world over, that only the U.K. reposes its confidence in the (modified) methylene blue test. All the other countries having bacteriological standards prefer to rely on colony counts, tests for the presence of Coliform organisms, and in several instances to require the absence of gelatin liquefying, faecal, and/or pathogenic organisms.

Use of foil for packing

E. E. Rumberger[13] and J. M. Cullinan[14] point out the advan-



APV "Rollo" automatic ice cream bar freezer.

Virtually complete automation of ice cream production, including computer calculation of mix formulæ, has been achieved for the first time, it is claimed, in the factory of one of the U.S.A.'s leading independent processors of dairy products, H. P. Hood and Sons, Boston. In addition to the computer, the automatic mix system incorporates batch blending of all ingredients by coded punch cards, graphic representation and centralised control of the entire mix process, including pasteurisation, homogenisation and cooling, automatic H.T.S.T. pasteurisation, and both automatic and manual in-place cleaning. The installation was supplied by the U.S.A. associates of Honeywell Controls, Ltd., who say that the basic scheme can be adapted to other food processes. Integration of the system with new equipment has increased the production capacity of the plant by about 70% to a rated capacity of 2,500 gal./hr.

tages of aluminium foil as a packaging material for ice cream. Its high reflectivity towards radiant heat, attractive appearance, and the ease with which it lends itself to printing are some of the features urged in its favour.

Trend towards continuous production

The whole trend, in manufacturing and processing technology, is towards continuous production methods. Considerable progress along these lines is manifest in one or two of the latest factories to be equipped solely for the making of ice cream on a large scale. The employment of metering pumps for mix ingredients, and continuous methods of heat treatment on the one hand, coupled with the development and perfection of straight-from-the-freezer wrapping and packaging machinery tee-ed into efficient, air-blast hardening tunnels, brings the industry within sight of this goal.

The new Food Hygiene (General) Regulations, 1960,[15] which came into operation on October 1, 1960, should, of course, be read and studied by ice cream makers and vendors. Those ice cream manufacturers who exercise their own laboratory control over milk purchased for their dairy ice cream department will want to familiarise themselves with the Milk (Special Designations) Regulations, 1960.[16] These regulations became operative on October 1, 1960, and include revised techniques for the phosphatase test and methylene blue test (for milk), specify a clot-on-boiling test for tuberculin tested milk, and re-enact the turbidity test for sterilised milk.

The Weights and Measures Bill[17] now before Parliament appears to exempt ice lollies and water ices from the provisions of Schedule the Fifth, Part 12, which, briefly, requires foods not exempted to be marked with their nett weight or capacity by measurement. There is no reference in the Act to ice cream as such, nor does it repeal the present legislation (Labelling of Foods (Amendment) Regulations 1959) relating to ice cream, the requirements of which need not be recapitulated here.

Quality is now very high

It is perhaps not inappropriate, in an annual review of this kind, to refer to the conferment of the M.B.E. (in the 1960 New Year's Honours) on the General Secretary of the Ice Cream Alliance.

Mr. James Baillie, in a speech made shortly after his recognition,[18] with characteristic self-effacement said that this honour meant that the ice cream industry was respected in Government circles as one making a first-class product under the highest possible standards of hygiene. Whether one agrees with Mr. Baillie's too personally humble interpretation of the bestowing of his M.B.E. or not, it is nevertheless true that, in spite of the statutory recognition

of a low-milkfat milk ice, one rarely if ever encounters a really poor quality ice cream these days. It is likewise true to state that whereas a decade or so ago, in the case of an outbreak of food poisoning one of the first commodities to fall under suspicion was ice cream, nowadays the circumstances are entirely reversed, and rightly so.

In spite of this, according to some statistics published in the daily press a year or so ago[19] we, in the U.K., only eat half as many helpings of ice cream per month as do our American friends; and rather surprisingly, we consume considerably less than do the Russians. In world ranking we are fourth, behind the U.S.A., the Soviet Union, and Canada, in that order.

It would seem, therefore, that an expanding home market still exists, and bearing Soviet Russia in mind, this in spite of the fact that in this space age, Jupiter Pluvius would seem to have over patronised this small island last year.

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CONFECTIONERY Industry
ANNUAL REVIEW

By D. R. Felstead,* F.R.I.C.

Developments during 1960 in marketing, legislation, packaging, technical education, international activities and research are described in this review.

THE last Annual Review of the Confectionery Industry, published in January, 1960, anticipated a reduced consumption of sugar confectionery and chocolate for 1959, and this pessimistic prediction was confirmed when the figures for that year were published. During 1957 and 1958 the average consumption of sugar confectionery and chocolate had remained constant at 8·3 oz. per head per week and in 1959 it fell to 7·8 oz. Fortunately there was a marked recovery in 1960 and there appear to be prospects that last year's figure will be found to have increased to the 1957 and 1958 level. In spite of the fluctuations in the level of consumption, the ratio of sugar confectionery to chocolate consumed has remained remarkably steady for the last four years at approximately 54:46.

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Take-overs

In the confectionery industry, as in so many others, a number of companies have been absorbed in the last two years; for example, the Beecham Group have absorbed James Pascall, Ltd., and Holland's have absorbed Walters "Palm Toffee," Ltd., and it appears likely that there will be further unification in the industry in the next few years.

Increasing competition, coupled with the fact that the *per capita* consumption of confectionery in this country is the largest in the world, suggests that one of the greatest prospects for the expansion of the industry in this country lies in an expanding export market.

Marketing developments

During the past year there have been three important developments in the field of the marketing of chocolate blocks in the U.K. At a time of apparent depression in the sales of milk and blended chocolate blocks, two large companies have introduced wrapped milk chocolate blocks, which carry the unusual retail price of 9d. and another company has introduced the "flip-top pack" (hitherto associated with cigarettes) as a new method of packing block chocolate.

Sales of chocolate blocks were about 80,000 tons in 1956 and represented over one-quarter of the total output of chocolate in Great Britain and by the end of 1959 these sales had dropped to 55,000 tons, which represented one-fifth of the total output. The

industry is watching with great interest the impression that these scientifically conceived and planned products will have on these shrinking sales trends.

Raw material prices

During the year the price of granulated sugar has remained steady in the approximate range of 67s. od. to 69s. od. per cwt. Similarly, the price of cocoa beans has remained very steady throughout the year and lower than has been customary for some years, at approximately £210 to £230 per ton for West African beans. Another satisfactory aspect of raw material prices has been the general drop in the price of vegetable fats; taking hardened palm oil as an example, the price per ton has dropped from £163 in February, 1959, to £127 in October last and, similarly, hardened coconut oil has dropped from £167 to £128 per ton in the same period.

The export market

The most important event in the field of European trade during the year was the realisation of the concept of the European Free Trade Association or "Outer Seven" which embraces Denmark, Norway, Sweden, Switzerland, Austria, Portugal and the U.K. The E.F.T.A. arrangements came into operation on July 1 last, the objects being progressively to reduce tariffs and to remove quota restrictions over a number of years, leading to their complete elimination by December 31, 1969.

In general, the confectionery industry has welcomed this development and it is of interest to note that E.F.T.A. has agreed upon a "process criteria" by virtue of which nearly all products of the industry will qualify for "Free Trade Area treatment" and details of these criteria have been published in a compendium published by H.M. Stationery Office.

The total export figures for the first nine months of 1960 indicate that the country's exports are continuing, in general, to increase, and this is illustrated by Table I, which compares the exports of sugar confectionery and chocolate for the first nine months of 1959 with those for the same period of 1960.

It will be seen that the figures, which exclude "other cocoa products" are approximately 7% higher than for the corresponding period of 1959, but that the increase in value of these exports is much smaller.

During the year the proposed external tariffs of the Common Market have been published. The possible effect on trade between this country and the member countries of the Common Market are best illustrated by Table II, which enumerates the new tariffs and those that they replace. In brief, these changes mean little change in tariffs payable by this country for exports to Italy and France, a general reduction in tariffs payable for exports to Western Germany and a substantial increase in tariffs to the Benelux countries.

Food colours

The greater general freedom of trade in confectionery, resulting from the establishment of the Common Market and European Free Trade Association will, it is hoped, result in a unification of regulations covering, for example, the addition of colours to confectionery products. There is, judging from the existing lists of permitted food colours published by the various member countries, a considerable diversity of opinion as to which colours are and which are not acceptable.

Table III, for which the author is indebted to the British Food Manufacturing Industries Research Association for permission to reproduce, serves to illustrate the many anomalies in the existing regulations.

In addition to the colours listed, Ponceau MX, Red 10B, Red 2G, Orange G, Orange RN, Yellow 2G, Yellow RFS, Yellow RY, Oil Yellow XP, Brown FK, Chocolate Brown FB and Chocolate Brown HT are permitted in both the U.K. and Denmark; Red 6BY, Red FB, in the U.K., Denmark and Austria.

The example of the Benelux countries in adopting a common list of permitted colours points the way but, unfortunately, new lists are still appearing and in December, 1959, new regulations governing the composition of food were introduced in Western Germany. The new regulations very considerably restrict the range of colours permitted for use in foodstuffs and very few are included which are also included in the U.K. list. The most surprising omission from the new West German list is Amaranth, which throughout the world, is one of the most widely accepted colours.

In June, 1960, the U.S. authorities introduced two "Colour Additive Amendments" which marked the beginning of changes in the U.S. attitude to food colours. The regulations continue to permit the present accepted colours, but legislate that they must be retested for their suitability for use within the next 2½ years, and predict that quantitative limits may also be set. They further provide that no colour which has been shown to produce cancer in man or animal by ingestion or "other pertinent exposure" will be listed.

Packaging odour

The continuing serious problem of odour in packaging was discussed in the last Annual Review. In October, 1959, a meeting was called by the Institute of Packaging to examine the situation and, subsequently, a Working Party was appointed. On November 24 and 25, 1960, a conference, organised by the Institute of Packaging, in conjunction with the Cake and Biscuit Alliance, the Cocoa, Chocolate and Confectionery Alliance and the Food Manufacturers' Federation, was held at the Connaught Rooms in London. A booklet containing a variety of papers on each of the following relevant subjects was issued to the delegates:

(1) quality control and testing;
(2) the influence of printing processes, package construction

Table I. Confectionery Exports

	Dollar markets	Non-dollar markets	Total
	(tons)	(tons)	(tons)
Sugar confectionery exported, 1959	10,900	13,480	24,380
,, ,, ,, 1960	12,100	13,650	25,750
Chocolate and chocolate confectionery exported, 1959	3,660	4,775	8,435
Chocolate and chocolate confectionery exported, 1960	4,115	5,380	9,494

Table II. Common Market Tariffs

Item	Past external tariff rates %				Future E.E.C. common tariff
	Germany	Benelux	France	Italy	
Sugar confectionery, not containing cocoa:					
(1) liquorice extracts containing more than 10% by weight of sugar	NIL	18	30	25	21
(2) chewing gum	35	18	10	27	25
(3) other items	35	24*	30	30	30
cocoa paste—bulk or block—defatted or otherwise	35	10	22·5	21	25
cocoa butter	35	6	23	25	22
cocoa powder unsweetened ...	30	10	23	22	27
Chocolate & other food preparations containing cocoa:					
(1) cocoa powder, sweetened, containing by weight					
(*a*) less than 60% sugar ...	30	18	30	30	30
(*b*) greater than 60% sugar	30	18	30	105	30

* *with exceptions.*

and surface design in relation to odour;

(3) odour problems in ink making;

(4) methods of minimising odour.

Much of the time of the conference was employed in the discussion of these problems by the 400 delegates and throughout it was very clear how seriously the food manufacturers viewed the problem and it was gratifying to observe the responsible attitude of the fabricators of all types of packaging materials.

The difficult problems associated with the establishment of standards and their scientific measurement, and the achievement of these standards by the packaging industries were ably expressed, but the view was widely held that although the fundamental research involved in the solution of these problems may be long-term, it was essential to take all possible steps in the meantime to minimise the problem.

Packaging materials

During the last few years there has been growing interest in all constituents of packing materials, not only from the standpoint of any odours that may be imparted to the foodstuffs they contain, but of their possible toxicity. The dangers lie in the possible transfer of any such toxic ingredients from wrappers to the food or in the accidental (or otherwise) consumption of wrapping paper.

This interest has recently been crystallised into the publication of regulations in France which are summarised below as they illustrate the nature of this problem.

A circular was published in the *Journal Officiel de la République Française* for December 30, 1959, which enumerated regulations relating to the colouring of plastic materials and wrapping. Earlier in 1959, France introduced a list of permitted plasticisers for wrapping materials and this second circular laid down that only those colours particularly designated might be used, and the colours must transfer no noticeable trace to the wrapped article of food. The list of permitted colours is divided into three sections:

(*a*) 75 organic colours;

(*b*) 9 further organic colours for cellulose films;

(*c*) 36 mineral substances and pigments;

and among the conditions listed were that these pigments and colours must have a high degree of purity complying with principles enumerated in earlier legislation and in particular their content of certain metals must not exceed the following limits:

lead	...	100 p.p.m.
arsenic	...	50 do.
mercury	...	50 do.
cadmium	...	1,000 do.
zinc	...	2,000 do.
selenium	...	100 do.
barium	...	100 do.

Further, the content of aromatic amines must not be more than 500 p.p.m.

Carbon black must not yield a benzene extract of greater than 0·1% and must be free from benzo-3, 4-pyrene. The circular lists the only foods, including confectionery, which may be wrapped in non-permeable coloured cellulose films—toffees may be wrapped in coloured cellulose films rendered impermeable by a nitrocellulose glaze.

Technical education

The importance of this subject was further brought into sharp relief by the two papers on the subject presented at the General Assembly at the International Sugar Confectionery Manufacturers Association at Munich last June.

The first was presented by Mr. Leon Burford, who is chairman of the Education Committee of the Cocoa, Chocolate and Confectionery Alliance. He outlined the three principal problems which confronted the industry in planning its programme of technical education:

(*a*) For whom should technical education be provided in the confectionery industry?

(*b*) How can it be made available to the largest number who would benefit by it?

(*c*) Should the contents of the courses be designed to appeal only to the confectionery industry or should they have wider appeal?

Herr Leder, who is director at the Technical School at Solingen in Western Germany, presented the second paper and traced the establishment and operation of this school.

Starting six years ago, the course provides courses for apprentices, foremen and skilled workers, and intends to broaden its scope in the near future, embracing courses for assistant managers and senior executives and in 1962 a theoretical and practical course is to start for "junior employers," *i.e.* for the sons of owners of businesses in the confectionery industry. This school attracts students from many other countries in addition to Germany.

The far-sighted policy of the school at Solingen will, no doubt, provide the industry in this country with useful ideas.

A number of the larger companies in the U.K. are providing theoretical and practical courses for their own employees to supplement those provided by the educational institutions outlined in the last annual review.

B.I.B.R.A.

Attention was drawn in the Annual Review for 1957 to the ever-increasing range of food additives, responsibility for the harmlessness and effectiveness of which is placed on the manufacturer by the Food and Drugs Act. Increasing restrictions being placed on the use of additives by all countries emphasise the need for an organisation to test these compounds, and during the year such an organisation, to be known as the British Industrial Biological Research Association, has been incorporated and has received the support of D.S.I.R.

Research

The annual general meeting of the B.F.M.I.R.A. was held in London in June with the president, Prof. A. C. Frazer, Professor of Medical Biochemistry and Pharmacology at the University of Birmingham, in the chair.

In introducing his address "The Present Status of the Food Additive Problem at Home and Abroad," Professor Frazer emphasised his view that the establishment of a biological testing station in this country was essential to test food additives, to carry out research and to act as an information centre. Professor Frazer divided food additives into three groups.

(*a*) The residues of agricultural chemicals; most of these owed their effectiveness to biological action. These residues, in finished food products, therefore were a matter of concern.

(*b*) Trace metals and other substances which may migrate into the food from processing machinery and wrapping materials.

(*c*) "Intentional additives," such as antioxidants, preservatives, emulsifiers, flavouring agents and food colours.

Professor Frazer then drew attention to the false belief, still widely held, that all natural products must be safe and that all things synthetic are suspect.

The meeting adopted the annual general report, which included a summary of work in progress at the Association:

(1) *Cocoa and chocolate:*
- (*a*) the volatile constituents of cocoa in relation to flavour;
- (*b*) rheology of chocolate;
- (*c*) glyceride constituents and stability of cocoa butter;
- (*d*) the detection of alternative fats in cocoa butter;
- (*e*) the determination of lecithin in milk chocolate.

(2) *Sugar confectionery:*
- (*a*) the drying of confectionery products;
- (*b*) moisture equilibrium of corn starch;
- (*c*) darkening of glucose syrups;
- (*d*) keeping properties of high boilings.

International committee

The Technical Committee of the International Office of Cocoa and Chocolate met in Brussels from January 28-30 and was attended by a delegation from this country.

The four main sessions dealt with:

(1) *Viscosity of chocolate and chocolate coverings*

The delegation adopted the uniform system of nomenclature agreed with the International Rheological Society and recommended a procedure for determining viscosity based on the Casson Flow Equation, which had been proposed by the B.F.M.I.R.A. Further practical work was agreed upon to examine more fully the proposed methods.

(2) *The analytical characteristics of cocoa butter*

Agreement was reached on the principal and secondary characteristics to be used as the criteria of the purity and quality of cocoa butter, namely melting and solidification points, refractive index, acid value, saponification value, iodine value and unsaponifiable matter. Existing methods of the International Union of Pure and Applied Chemistry were adopted where applicable and practical work was planned for comparative trials of the methods of determination for the semi-micro and total indices for iso-oleic acid.

(3) *The organoleptic assessment of cocoa*

A scheme was proposed and examined for the comparison of a test sample of cocoa against a reference standard, and of a statistical assessment of results. The problem of assessing test samples where there is no reference standard remains to be resolved.

(4) *The assessment of cocoa beans*

Two colorimetric methods and one titrimetic method, using potassium permanganate, were considered, in addition to the examination of beans by the cut test, and these methods are to be compared in the laboratories of the delegates.

International organisation

The sixth General Assembly of the International Sugar Confectionery Manufacturers' Associa-

Table III. Anomalies in food colour regulations

	Colour Index No. 1956	EUROPEAN FREE TRADE ASSOCIATION							COMMON MARKET			
		U.K.	Denmark	Sweden	Norway	Portugal	Switzerland	Austria	France	Benelux countries	West Germany	Italy
Red Colours												
Ponceau 4R	16255	P	P	P	P	—	P	P	P	P	—	P
Carmoisine	14720	P	P	P	P	—	P	P	P	P	—	P
Amaranth	16185	P	P	P	P	P	P	P	P	P	—	P
Erythrosine BS	45430	P	P	P	P	—	TP	TP	P	P	TP	P
Ponceau SX	14700	P	P	P	P	—	—	P	—	TP	—	—
Ponceau 3R	16155	P	P	—	—	P	—	—	—	—	—	—
Fast Red E	16045	P	P	P	P	—	P	P	—	P	—	P
Ponceau 6R	16290	—	P	P	P	—	—	P	—	—	P	P
Scarlet, GN	14815	—	P	P	P	—	P	P	P	TP	—	P
Acid Magenta II	—	—	P	—	—	—	—	P	—	—	—	—
Orange and Yellow Colours												
Orange GGN	15980	—	P	P	P	—	—	P	—	—	P	—
Oil Yellow GG	11920	P	P	—	P	—	—	—	—	—	—	—
Tartrazine	19140	P	P	P	P	P	P	P	P	P	P	P
Naphthol Yellow S	10316	P	P	P	P	P	—	—	—	—	—	—
Sunset Yellow FCF	15985	P	P	P	P	—	P	P	P	P	P	P
Acid Yellow	13015	—	P	P	P	—	P	P	—	P	P	—
Quinoline Yellow	47005	—	P	—	P	—	P	P	P	P	P	P
Chrysoin	14270	—	—	—	—	—	—	P	P	P	P	—
Yellow 27175	13445	—	—	—	—	—	—	—	—	—	P	—
Green Colours												
Green S	44090	P	P	—	—	—	—	—	—	TP	—	—
Guinea Green	42085	—	—	P	P	P	—	—	—	—	—	—
Fast Green FCF	42053	—	—	P	P	—	—	—	—	—	—	—
Blue Colours												
Blue VRS	42045	P	P	P	P	—	—	P	—	—	—	—
Indigo Carmine	73015	P	P	P	P	P	P	P	P	P	P	P
Indanthrene Blue	69800	—	P	P	P	—	—	P	P	TP	P	—
Patent Blue	42051	—	—	—	—	—	—	—	—	TP	—	P
Violet Colours												
Violet BNP.	—	P	P	—	—	—	—	—	—	—	—	—
Formyl Violet	14265	—	—	P	P	—	—	—	—	—	—	—
Acid Violet	42640	—	—	P	P	—	—	—	—	—	—	—
Black PN.	28440	P	P	P	P	—	P	P	P	P	P	P

P—permitted
TP—temporarily permitted

tion was held in Munich on June 15 and 16 and was attended by over 200 representatives from twelve countries, including Argentina and the U.S.A. The retiring president, M. Henri Cornet of Belgium, relinquished the presidency to Dr. Harman Mahnkopf of Germany, who will be president for the next three years.

The principal business on the agenda was the presentation and discussion of a number of papers of wide interest, including technical education, the sweetening power of glucose, dextrose and sucrose, the concentration of the confectionery industry, the standardisation of regulations affecting confectionery, marketing, unfair competition, the Common Market and the European Free Trade Association.

Two papers were read on the problem of standardising the regulations affecting confectionery. Both authors, Dr. Klose, of the Secretariat of the German Chocolate and Sugar Confectionery Manufacturers' Association, and Mr. Baechstaedt-Malan of Monaco, the vice-president of the International Association, stressed the need for co-operative action to press for European and International Standardisation in order that the efforts to reduce the barriers of European and World Trade should not be frustrated.

Mr. C. L. Hinton, formerly superintendent of research of the B.F.M.I.R.A., supported the speakers and suggested that the appropriate organisations to undertake this work were F.A.O. and W.H.O.

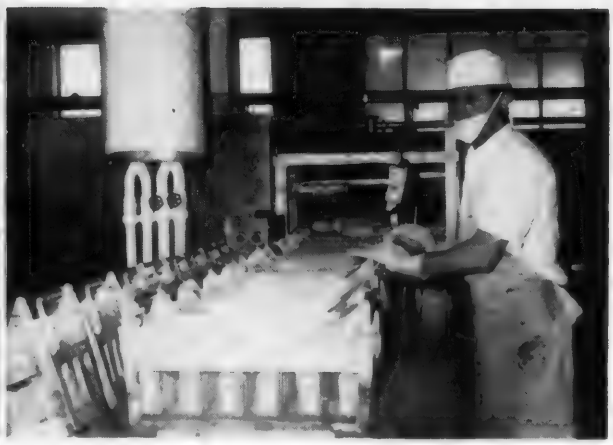
How the C.W.S. makes Biscuits

(*Concluded from page 9*)

band conveyor much in the same way as the Swiss rolls), a wafer oven and a cutting machine, the whole process of making a wafer from start of mixing to the emergence of the cut pieces taking 1½ minutes.

Some Suppliers of Equipment

Baker Perkins, Ltd.: high-speed, vertical and continuous mixers, depositors, baking ovens, wrapping machines, tempering machine.
Bagshawe and Co., Ltd.: conveyors.
Bramigk and Co., Ltd.: chocolate kettle.
John M. Campbell, Ltd.: *Swift* labellers.
Davidson and Co., Ltd.: extractor fans.
Morton Machine Co., Ltd.: pressure whisks.
E. T. Oakes, Ltd.: continuous mixer.
SIG Wrapping Machines, Ltd.: wrapping machines.



(*Left*): **Boiled sweet wrapping by high speed machines.** (*Right*): **Ice lolly production.**

Italian Confectionery Plant

Alemagna of Milan stresses hygiene and modernity

Confectionery, ice cream and baked goods are produced by the Alemagna Co. at their modern and highly organised factory in Milan, recently visited by FOOD MANUFACTURE'S editor, who took the pictures on this and the opposite page.

ALEMAGNA'S Milan plant is a modern and highly organised unit producing quality confections for the better-class market. Besides a variety of sugar and chocolate confectionery and biscuits of all kinds, it produces ice cream, ice lollies and several lines of baked goods including panettoni, a half-bread half-cake product made from fermented dough which Italians eat in large quantities.

Panettoni is made in various sizes up to 5 kg and manufacture takes two days. After being mixed in dough mixing machines the dough is seeded from the previous batch and fermented with yeast for 8 hrs. at 33° C. In hot summer weather it is necessary to cool the dough. For baking the panettoni there are two electric and four gas ovens.

Other products made in the bakery are croissants, cakes of various kinds, macaroons, etc.

The general manufacturing techniques used for confectionery and biscuit manufacture seem little different from conventional British practice; indeed, much of the machinery is the same. One machine in the boiled sugar department which caught our eye was a pair of mechanical "hands" for folding in boiled sugar masses. The machine comprises two specially shaped scoops on the ends of operating arms which work in a fashion very similar to a child's spoon and pusher; as the scoops come together the mass is folded over, and when the scoops part the mass is deposited on the rotating table and flattened by a hammer blow from the scoops. The table rotates through part of a circle and the process is repeated. Hand folding in is also carried on in the traditional manner.

Hygiene precautions in the ice cream and ice lolly departments go to the length of making the

(*Concluded on page 30*)

Preparing dough for croissants.

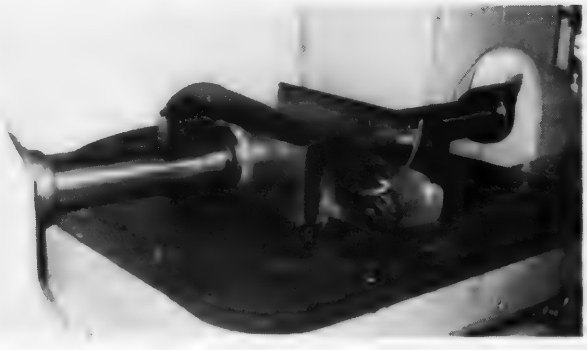
Workers in the ice cream department wear face masks.

Hand rolling and cutting of dough.

Hand working of boiled sugar.

Biscuit packing.

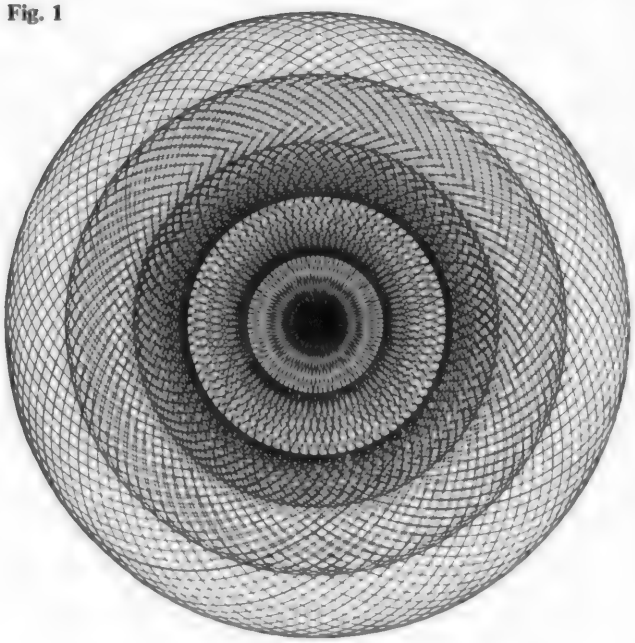
Ice lolly packing.



Machines in the sugar boiling section include conventional ones like this rolling machine (*left*) and less conventional ones like this folding and kneading machine (*right*) which folds and works the boiled mass with the aid of two mechanical "hands" and a turntable.

Using Your Mixer

Fig. 1



By J. Girling,* F.Inst.B.B.

This stimulating article for the user of vertical mixers of the smaller type brings a fresh approach to the subject and maintains that a high proportion of machines are not used to their fullest advantage. It makes the point that exemplary mixing of pastry, dough and similar materials can be achieved as well as if not better than by hand even with unskilled operators.

SOME viewpoints that I shall put forward I know theoretically are totally opposed to certain accepted practices, but from experience I have proved them absolutely sound. However, I hasten to add that at no time have I ever despised accepted practice, and neither shall I ever do so, but I sincerely trust that this article will stimulate at least some readers to try my ideas and let me know of the results.

Three types of vertical mixer

As a rough generalisation let us all understand that the three normal pieces of equipment for a vertical mixer fall into three main classes—*Hook* for heavy, *Beater* for medium, and *Whisk* for light mixings. There are, of course, other types available and some attention will also be paid to these.

Geometric action

Firstly, the geometric action of most vertical mixers should be appreciated, and the accompanying diagram (Fig. 1) will help in this respect. This diagram was actually drawn by an 80 qt. mixer, but has been reduced in size in order to accommodate it on the page. I now want you to imagine an 80 qt. mixer, but instead of having affixed a beater, whisk or dough hook, the machine has fitted to it an L-shaped shaft. This L is short perpendicularly but of sufficient length horizontally to reach the periphery of the bowl. At this position a ball point pen is affixed, 1·8 in. toward centre a second pen also, and at a further 1·8 in. a third.

To the top of the bowl a drawing board and paper are secured and after raising the bowl until the pens contact paper, the machine is operated in first gear.

(*Above*): **Fig. 1; the traces of three pens mounted on a bracket fixed at right angles to the shaft of a mixer of the type shown at the top of the next page. It must be remembered that the shaft not only rotates but moves in a circular path by means of epicyclic gearing**

It is immediately apparent from the diagram that anything other than complete coverage is impossible and if you stop to consider that this virtual "filling in" was achieved with the area of three ball point pens over the area of a 20 in. diameter bowl, you will further realise that each piece of

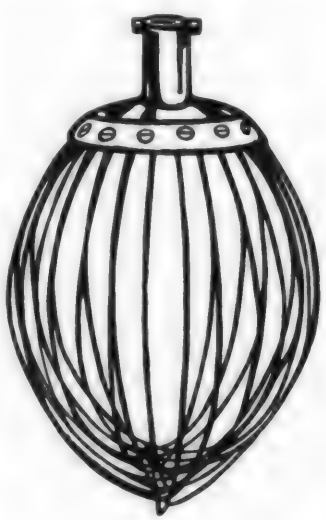


Fig. 2

* Technical Adviser, Peerless and Ericsson.

equipment, be it beater, whisk or hook, has a surface area several thousandfold greater and this, coupled with the epicyclic path of travel, renders the modern vertical mixer unsurpassed for aeration, dispersion and high shear factor.

The whisk

Let us now think about the whisk—the model illustrated in Fig. 2 is the *Balloon Whisk* and its function is primarily for incorporating air into a mixing; it is therefore ideal for light creams, light marshmallows, meringues, japs, sponges, etc.

It is well worth remembering however, that most machine manufactures make what is called a *whip*, as illustrated in Fig. 3. This can virtually be looked upon as a cross between the normal beater and whisk and is, therefore, advantageous for use with "heavier" type mixings where strength coupled with maximum aerating qualities are required.

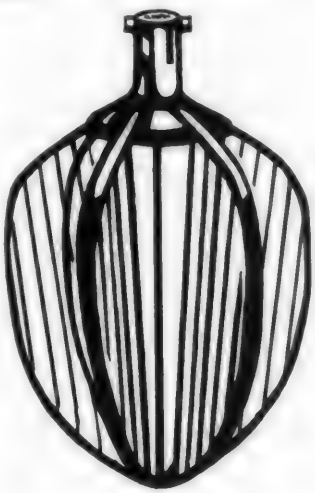
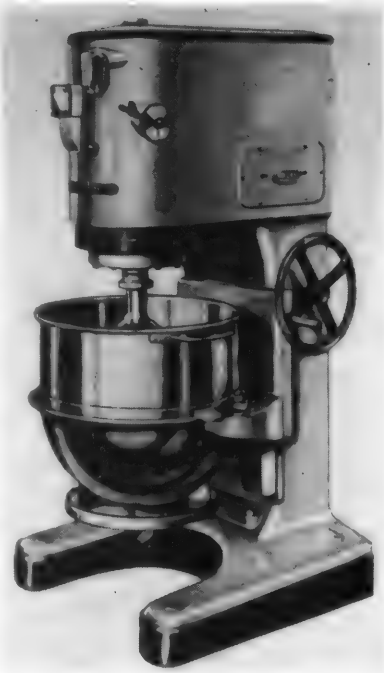


Fig. 3

This piece of equipment should always be used for the marshmallows that are too heavy for a balloon whisk, as far greater volume will be attained than when using an ordinary beater. Also it is excellent for producing the now popular "all in" type of sponge.

The hook

Dough hooks are normally supplied in one or other of the forms



illustrated in Figs. 4 and 5 and are generally capable of producing satisfactory doughs.

I personally am not too favourably disposed toward the type illustrated in Fig. 4 as it tends not to cut its way through a dough sufficiently, but merely forms a "ball" that revolves around on the hook—this naturally achieves nothing in the way of gluten development but does, of course, relieve an enormous strain on the machine. You, of course, are not concerned with how much strain can be lifted from your machine, or for that matter whether the machine could cope in the event of the type illustrated in Fig. 5 being fitted. Your interest is to produce a well-developed dough in the shortest possible time.

Fig. 4

Such is much better acquired with the hook of Fig. 5. Due to its shape and prescribed path, it creates a far greater initial disturbance and after "doughing up" the "ball" is constantly subjected to high stretch and shear factors between hook and bowl. This treatment naturally results in the optimum conditions for dough production in a vertical mixer.

The hook is also used for mixings produced by the "rubbed in" method and it is in this respect particularly that I deviate from accepted practice. Far too often I have heard people state that certain types of goods such as pie and sweet paste, scones, raspberry buns, rusks, etc., cannot successfully be produced on a machine. It is claimed that the finished goods are tough—having seen some of them I entirely agree—but do not blame your machine. I would state that all such goods were made using a hook and first gear only. Such practice merely results in consolidating a mass in the base of the bowl by gravitation, there being insufficient speed to overcome this.

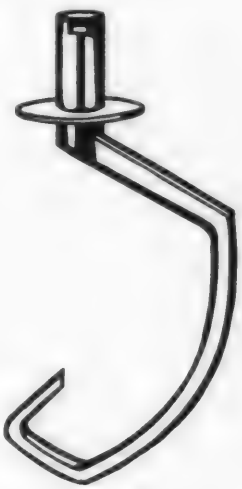


Fig. 5

What to use and when

To explain, I advise as follows:

1. Where total mass of dry ingredients exceeds two-thirds of bowl volume—use hook.
2. Under these conditions liquor must be at hand for quick addition.
3. Start machine in first gear and as soon as large pieces of fat have dispersed, change to second gear. Within a few seconds only a friable condition will be reached and liquor should be added in one lot with machine still running in second gear, the whole process taking a matter of seconds. The resultant mix will not be tough, but in fact lighter than that produced by hand.
4. Where total mass of dry ingredients is less than two-thirds bowl volume—use beater.
5. The procedure adopted for mixing is as in 3 above.

If a pastry knife is used, results are also improved if the machine is operated as above.

I would like now to explain the reasons leading up to my method and I am sure that you will then understand why this is a much better approach to rubbed-in mixings.

When one makes such a mixing by hand the only advantage available to the operator is a sense of "feel" and experience tells us if the mixing is becoming tough. It does not toughen in experienced hands, however, because during the rubbing in, one constantly ensures that the dry ingredients are lifted and allowed to fall back on to the board. This procedure naturally keeps mixing slightly aerated and definitely informs the operator of its general condition.

Without being aware of why, or actually what one does during this hand mixing process to obtain a satisfactory mixing, we know that subconsciously the "feel" makes us do something, but a machine cannot "feel."

This state of affairs is not so complicated as it might at first appear. With a little objective thinking it can soon be realised that to produce "rubbed in" mixings by machine, we must assimilate as near as possible the condition created when mixing by hand.

Let us now, therefore, imagine a machine bowl one third full with dry ingredients. If the hook is operated in first gear only, very little disturbance occurs and this merely tends to "grind" materials into the bottom of the bowl. Now fit the beater—the result is at least twice as much disturbance, but still with a strong tendency to "grind"; when second gear is engaged, however, you will see an immediate change.

The whole mass becomes "alive" within the machine bowl, the centrifugal force generated overcomes gravity and it is obvious to the sight that what is now happening within the machine bowl is as near as possible a reproduction of the conditions generated by hand—but with one critical exception, the work is accomplished in a mere fraction of the time and it is for this reason that the liquor must be at hand for immediate addition.

Why have a machine and still make many rubbed-in mixings by hand? Try this method and let me know of your results.

The beater

Lastly I will deal with the beater as such (Fig. 6). There are, of course, far more variations of this piece of equipment than any other and whilst they all perform an excellent job, I personally prefer the type that has a dihedral incorporated in its main frame and/or cross bars.

Fig. 6

When using such a beater, I find all things being equal regarding temperature, etc., any given mixing can be produced with a 20% reduction in time.

There are no special tips that I can pass on to you concerning the uses of a beater, other than that covered for its operation of rubbing in.

Attachments for various functions

Until now I have only mentioned the basic vertical mixer, but it should not be overlooked that, in addition to its uses as described above the machine can also be used to motivate a comprehensive range of attachments that are especially designed by the manufacturers.

These attachments perform a variety of functions and thereby render the vertical mixer an absolute necessity for food preparation.

I wonder how many of you have a mixer and still chop your cabbage or grate your carrots by hand?

As a guide I will list the attachments:

1. Vegetable slicer. This, by fitting differing cutting plates, can also be used for cheese grating, bread crumbing, chipping and preparing julliene vegetable.
2. Mincer (meat chopper).
3. Oil dropper. For production of mayonnaise.
4. Soup strainer. This, incidentally, can also be used for producing moist bread crumbs.
5. Coffee grinder.
6. Purée processor.

One general tip—when purchasing a machine, always buy the next size bigger than the one you think you require; even so, there will be times when you wished you had a bigger one.

▶ A recent edition of *Case*, published by Reed Corrugated Cases, Ltd., includes articles on some of the uses of their cartons. Some examples of colour in corrugated cartons are shown.

TEA—what influences quality?

Experience and experiment over a hundred years

By C. R. Harler

The author is a scientist who has worked in the tea industry for many years. After experience ranging over more than a century the industry is able to correlate variety of bush, climate and manufacturing methods with liquoring qualities and flavour. Present research is directed towards linking quality and flavour with chemical analysis, but the tea taster is, and likely to remain, the final judge of tea.

THE use of an infusion of dried tea leaves as a beverage has its origin in antiquity. According to existing records, tea was first cultivated and the leaf prepared in China, and the first authentic description of procedure was written by Lo-Yu in A.D. 780. It is possible, however, that the tribes of the Shan States of Burma, China and Siam, led by that instinct which prompts even primitive peoples to make use of an alkaloid-yielding plant, have taken tea in some form or other as long as the Chinese. The tea plant was introduced into Japan, from China, about A.D. 800, but for the next 500 years tea was regarded there as a medicine rather than a beverage.

There are many ways of preparing the tea leaf, but most tea today is designated green or black, the former being known as unfermented and the latter as fermented tea. The term "fermentation" is incorrectly used in this connection. In making black tea, the live, wilted leaf is rolled, whereby the leaf cells are distorted and certain polyphenol bodies are mixed with leaf enzymes and oxidised. The substances thus formed then condense to give yellow and red products which are responsible for the briskness, strength, body and colour of the infusion. Tea drinkers have acquired a taste for these substances. When the changes described have proceeded far enough, action is stopped by heat, whereby the leaf is dried. Quality and flavour are developed during the so-called fermentation.

The author (*centre*) in a typical tea field near Rize in Turkey, with Mr. Omer Bucukoglu (*left*) and Mr. Mevlut Kinez.

In making green tea, the fresh leaf is first killed by heat, and the leaf enzymes thereby inactivated. As a result of this, the changes in the polyphenols mentioned above do not take place during rolling. Both black or green teas may be compressed into bricks or tablets.

Tea is drunk primarily for the caffeine it contains, which may constitute up to 4% of the dry matter in young leaf. A cup of good tea, first brew, contains about a grain of caffeine, but its food value in calories is only about 4. With milk and sugar this last figure may be raised to 40.

The tea plant

The China variety of tea plant was the one first known to Europeans, who saw it in China and Japan. Other varieties were later found in the hills of Assam, Burma, Siam and Cambodia. Many of the types were given botanical names and, over the years, more than 80 such are recorded in the voluminous writings on the

subject. Some 20 years ago, the International Code of Botanical Nomenclature fixed a single name for the species, *Camellia sinensis* (L) O. Kuntze.

The tea planter in Assam has, for a century or more, recognised several types of tea, based mainly on leaf appearance. These range from the China bush, with small, stiff, erect, matt leaves, to the Lushai 60-ft. tree with flabby, drooping, glossy leaves, up to 14 inches long. Between these extremes come the China-hybrid, in many forms, the Cambodian, light-leaved and dark-leaved Assam, the Manipuri and the Burma types. In north-east India the China-hybrid, the dark-leaved Assam, the Manipuri and the Burma types are used, according to the climate of the area in which the estate is located.

Each of the four types has its own peculiarities. The China-hybrid is hardy, although it gives a poor yield and inferior teas in the plains. In the Darjeeling hills, however, it produces remarkable flavour. The Assam type gives very high yields and outstanding quality in the plains of the Assam Valley, but it is not hardy enough for general use in the plains of Cachar, Sylhet, the Dooars and Terai. Accordingly, the Manipuri and Burma types are grown in these areas, in spite of the fact that quality is markedly inferior to that produced by the Assam type.

Tea is generally grown from seed, but it can be propagated vegetatively. Such methods were first practised in Japan about 1860, and studied in Java from 1910 onwards. The procedure received great impetus when it was found in Cachar, Assam, in 1928 that the plant could be propagated from single-leaf cuttings. Many clones have been selected for crop and quality, and biclonal and polyclonal seed is under trial. Yet, in general practice, seed is still preferred, partly because the types favoured by the experienced planter in the plains do not propagate easily from cuttings. The China-hybrid grows readily from leaf-cuttings, but apparently no single bush carries the full, true Darjeeling flavour. Much remains to be discovered about vegetative propagation, and the process no doubt has great potentialities.

In 1958, J. R. Sealy published, *A Revision of the Genus Camellia*.[1] One species of tea is recognised, *C. sinensis*, comprising two varieties, var. *sinensis*, the China plant, and var. *assamica*, the large-leaved plant. It is considered that the other so-called varieties of tea are just ecotypes or merely cultivars.

Within the genus Camellia, eight different sections are recognised, one of which is designated *Thea*. The tea plant comes within this section, of course, and also a very rare plant, *C. irrawadiensis*. This last was found on the Burma-China border at 7,500 ft. altitude, and resembles the China tea plant in appearance. However, the leaves contain no caffeine, nor the range of polyphenols commonly found in true tea leaf. The prepared leaf of this plant is not accepted by the tea taster as tea. Yet, when it is crossed with the Assam plant, var. *assamica*, the hybrid produces leaf accepted as tea. It is considered that much of the tea originally planted in Assam was of this hybrid stock, and it may still constitute 5 to 10% of the present stand. It is further considered that this hybrid may be responsible for the rare and highly valued Darjeeling flavour.[2]

The China tea trade

The first consignment of tea was brought to Europe by the Dutch in 1610 from China. Tea was introduced into England about 1645, and public auctions in London were first held in 1657. Meanwhile, the East India Company was developing its trade with China, and by 1715 it had taken complete control of the tea export trade, a monopoly which it held till 1833. This year marked a turning point in the history of the tea industry.

The China tea trade was based on Canton and the company bought tea there in the early summer and shipped it away. Very little was known of the methods used in growing the crop or preparing the leaf in the villages, for foreigners were not allowed inland. The Chinese themselves classified tea as green, black, brick, tablet, ball or dust, and also according to the 120-odd localities where it was grown. Then the age of the plant perhaps, and the picking were denoted. The first and second, or spring pickings, were the best and used for export. Later pickings gave thinner teas and were used for home consumption. Altogether there were several thousand grades.

Yet, complex as this system may seem, it was no more so than that used today. Thus, in north-east India alone there are six districts or more, and perhaps 1,000 marks or estate names. Every estate produces maybe 30 invoices a year, each of several grades, which are described, listed and auctioned separately.

The China export trade reached its peak in 1888, when it amounted to 300 million lb. Thence onward, first Assam, then Ceylon, South India and Java became important exporters. Today, India is both the world's greatest producer and exporter of tea.

Early days in Assam

When the East India Company lost its monopoly of the China trade, it began to open up its own estates in Assam. Although the tea plant was found growing there, China seed was imported. However, in 1838, enough tea was prepared, by the China hand process, from indigenous Assam plants to send an invoice to London. This sold well, and was an event of great importance because it showed that the large-leaved plant could replace the China bush.

Growing and preparing tea on plantation scale presents problems not encountered in dealing with a small, family plot. Accordingly, changes in procedure became necessary. In the preparation of black tea in the Chinese village, the leaf is withered in the sun for a couple of hours, then it

Choeb Kalaye tea processing factory in Iran, which is one of six in the country controlled by the Government through its own tea company. (*Left*): Tea roller. (*Right*): Sorting green leaves.

is hand rolled, thrown into a hot iron pan, rolled again and so on till it is too crisp for further handling. It is then slowly dried for hours over a small charcoal fire. This procedure was necessarily simplified in Assam. The leaf was withered overnight, then hand rolled once and placed to ferment, during which time the colour, strength and body of the liquor develops. Drying was carried out quickly in a stream of hot air.

About 1870, machinery was introduced, mechanical rollers and driers were invented, and by 1890 mechanisation was complete. But every modification in procedure was based on the tea taster's report and advice, and in this way the whole set-up of tea production was different from the days of the China trade.

By 1895, planters in Assam, Sylhet, Cachar, Darjeeling, the Terai and Dooars (tea areas which constitute north-east India) had become closely aware of the effects of seasonal change, the weather, field work and details of manufacture on the final product. It soon became evident that the type of bush had a fundamental effect on the quality and flavour of the tea.

The accumulation of such detailed knowledge was made possible by the fact that daily records of procedure are kept in all factories, and every grade of every invoice is described and evaluated by tea tasters in Calcutta and in London. The correlation between leaf production, manufacture and the finished tea is thus based on a great mass of evidence accumulated over the years.

Tea tasting

A taster's infusion is made from a quantity of tea equal to the weight of a silver sixpence or 4-anna piece (about 1/10th oz., 3 g. or 34 grains), made in a ¼-pint pot fitted with a lid. Boiled water is poured into the pot and the lid replaced. After 5 or 6 min. the infusion is poured into a handleless cup of somewhat greater capacity than the pot, and the infused leaf is then shaken on to the inverted lid, which is placed in this way on top of the pot.

The dry leaf is described, its make, grading and complexion, and the presence of stalk, fibre or "tip" noted. The colour and aroma of the infused leaf is then dealt with. Finally, the appearance of the liquor is judged, and some is sipped from the cup with a loud, sucking noise, and then spat into a tall spittoon. By this means the taste on the tongue is realised, the thickness of the liquor felt in the mouth, and the pungency sensed on the gums, tongue and cheeks. The flavour is realised during tasting by drawing air up to the olfactory nerve and sending it out through the nostrils.

The optimum temperature of the liquor for tasting is 106° to 110° F. When the liquor cools a precitate or "cream" settles, composed of oxidised polyphenols and caffeine, and this is observed and recorded.

About 120 terms are used in describing the leaf, the infused leaf and the liquor, and about 75 of these deal with faults or shortcomings. A taster can describe and evaluate a tea in less than a minute, and on a busy day will deal with perhaps 500 samples.

The infused leaf should be bright, reddish and even in colour. The infusion should be bright, reddish and be brisk, strong and coloury, with pungency. The flavour or aroma is complex and comprises the characteristics of several groups of smells. It should be fragrant as of flowers, spicey as of cloves, and burnt as of caramel. There may also be a faint caprylic odour, perhaps developed during withering. Such odours may be desirable if very dilute, although offensive if strong.

The briskness, strength, colour and body of the liquor are mainly due to polyphenolic bodies formed during fermentation. The caffeine has no recognisable taste in tea liquor, although, as already men-

tioned, it forms part of the "cream." What constitutes quality is not yet defined, but it may include certain aromas, tastes and sensations in the mouth.

All well prepared teas have some quality and some flavour, but these properties must be well developed for a tea to be sought after on their account.

Leaf pubescence and quality

As mentioned previously, it soon became evident in north-east India that the type of bush controlled marked quality or marked flavour. The large-leaved types —Assam, Manipuri and Burma— produce much better liquors than the China-hybrid in the plains districts, whilst the Assam type may give outstanding quality in the spring flushes. However, the Manipuri and Burma types are more hardy than the Assam, and easier to grow in Cachar, Sylhet, the Dooars and Terai, where the hot, dry spring severely taxes the vitality of the tea stand.

About 1900 it was realised that many plants of the Assam type have young leaves which are markedly pubescent (hairy) on the under surface, and it soon became evident that such plants produced high quality teas. Why this point should have had such belated recognition is difficult to understand, because the Chinese word *pek-hoe*, so frequently used in naming the finer grades, means fine-hair. The "tip" in black tea, taken as a sign of quality, is of a golden colour, resulting from the smearing of these hairs with tea juice during rolling.

In Assam, the tea bush practically ceases to flush in the cool, dry season, lasting from December to March. In April, May and early June come the spring flushes, and high quality teas are made from stands with pubescent leaves. The rains teas, June to September, are highly coloured and strong with a little quality. In the autumn there is perhaps some revival of quality.

In the other plains areas of north-east India, the pubescent Assam type will grow if cossetted, and it then produces teas markedly superior to those given by the Manipuri and Burma types. Individual bushes of these last two types may be pubescent, and strenuous efforts are being made to propagate them as clones and from poly-clonal seed bearers. Pubescence is a recessive gene in the tea plant, so that crosses between pubescent plants produce pubescent offspring.

The economic life of a tea bush is 40 to 60 years. Extensive replanting began in Assam about 1920 and much of the original stand has been replaced by the pubescent type. The improvement of Assam teas has, on this account, been marked over the past 40 years. Replanting is a slow process, however, since it is practicable to uproot and replant only about $2\frac{1}{2}\%$ of the acreage per annum.

Bush type and flavour

Marked flavour does not generally occur in Assam teas. The China-hybrid plant grows well in the plains of north-east India and is a hardy plant, but it does not yield as well as the large-leaved types and it produces poor teas with a "China tang." Yet, in Darjeeling the China-hybrid gives the remarkable spring flavour, considered possibly to be due to the hybrid cross between *C. irrawadiensis* and *C. sinensis*, var. *assamica*, as described in an earlier section.

The tea in Darjeeling is planted up to 6,500 ft., but most of it is at 3,000 to 4,000 ft. Here the winter is mild and the spring warm, but the growth much slower than in the plains. There are areas in Darjeeling planted to the large-leaved types used in the plains, but these do not produce the flavour for which the area is famous.

Climate, quality and flavour

So far, no sure visible sign of flavour has been noticed on the leaf, corresponding to pubescence and quality in the case of the Assam type. It is thought possible, however, that the presence of red pigment or of pellucid dots, both derived from the *C. irrawadiensis* side of the hybrid, may give some indication of flavour.

Thus it would appear that, so far as north-east India is concerned, climate and bush type can be linked up with the definite seasonal production of marked quality or flavour. These observations may be extended to include other tea lands.

In Ceylon, although the bush flushes throughout the year, there are still definite periods in the spring and autumn when growth is rapid. In the high-grown areas, the stand is China-hybrid, indeed, much of the seed was imported in the early days from Assam, and the spring teas are noted for flavour and also quality. The large-leaved types do not produce such marked characteristics in the high-grown areas. The reverse holds in the low-grown areas, where the hybrid gives poor teas, whilst the large-leaved types make good teas with useful liquors.

In south India, climatic conditions resemble those in Ceylon, but the teas of many high-grown estates fall definitely short of Ceylon standards. This is perhaps because the stand is of the large-leaved types.

In Java there are no standout periods for quality or flavour, although intense study has been given to the subject in the past. The climate here is so equable that the flushing rate is steady throughout the year. Even tea grown on the Pengalengan plateau at 5,000 ft. has no marked periods for quality or flavour.

The tea areas ranging from Ranchi, Behar to Turkey may be considered now. In Ranchi, Dehra Dun and Kangra (all in north India), the spring drought is so fierce and hot that only the China bush or China-hybrids can thrive. Much of the outturn from these districts is green tea, but if black tea is made it is never of standout quality or flavour. In Iran, Georgia, U.S.S.R. and Turkey, the cold winter season, often accompanied by snow, puts the large-leaved types out of court and the China-hybrid is used. Much of the stand in Georgia was

grown from Darjeeling seed. In all these countries, spring temperatures are high and early flush teas with marked flavour are certainly not made.

The tea countries in eastern Africa are of interest in the present discussion, because the tea industry in these areas is not yet fully conscious of the importance of bush type, as it is in the older producing countries. In Kenya, Uganda, northern Tanganyika and the Belgian Congo, the climate is equable, and marked periods of quality or flavour are unlikely. Nevertheless, it would undoubtedly pay to grow good, pubescent Assam types where possible.

Leaf and tea analysis

In southern Tanganyika, Nyasaland, Portuguese East Africa and Southern Rhodesia, the climate is such that what practically amounts to a close season is experienced. Here, an Assam pubescent type should produce good spring quality, if it can be grown. Otherwise, a good Manipuri type would be markedly preferable to much of the present stand.

It may now be asked whether the correlations discussed can be linked up with the chemical analysis of tea leaf or tea.

Over the past 25 years great advances have been made in the study of the chemistry of tea, aided largely by the use of paper chromatography.

Such has been of great value as an aid to the taxonomy of the species in the Thea section of the genus Camellia.[3]

Chromatography has been employed in studying the polyphenols in tea leaf, which comprise a mixture of about 30 different substances.

Of these, epi-gallo-catechin and epi-gallo-catechin gallate undergo oxidation and condensation during the fermentation process.

As a result, bisflavonals, theaflavins and thearubigins are formed, producing briskness, strength and colour. The theaflavins may be allied to quality.[4]

The substances concerned with quality and flavour are still under study.

Conclusions

A certain climate and the right type of tea plant are necessary to the production of outstanding quality or flavour in tea.

The tea taster will always be the final judge of teas.

The study of the chemistry of tea is essential in order that logical advance shall be made.

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Correspondence

The 1860 Act

SIR,

I was delighted to find general support for my views on the Adulteration Act of 1860 from a practising public analyst, and am grateful to Mr. McLachlan for his interesting elaboration of some of the issues raised. I would like, however, to reply to two points in his letter.

First, when I stated that the 1860 Act was "an utter failure" I was anxious to underline the distinction (which other writers on the subject appear to ignore) between the passing of an Act and its effective enforcement.

The weakness of much Victorian social legislation, in this field as in others, was that it was purely permissive, and local authorities who, for one reason or another, did not wish to adopt it did not do so. The 1860 Act is of historical importance in that it represented a new incursion of the state into the field of social policy, but its immediate practical effect was negligible. As Mr. McLachlan himself admits, the effective measures were those of 1872 and 1875.

Second, Mr. McLachlan misconstrues my point about the place of co-operative societies. What I was suggesting was that by about 1870 pure food was available to those who could afford it—to the middle classes in "respectable" higher-priced shops, and to a section of the working classes in co-operative stores. There is abundant evidence (which I will gladly produce) to show that the early co-operative societies placed as much emphasis on purity as on cheapness, even going to the length of erecting their own corn-mills in order to ensure a supply of pure flour, and employing lecturers to tell the public what pure food should look like. In short, my view is that the undoubted improvement in the quality of food which was taking place a hundred years ago was due far more to voluntary reform by manufacturers and traders than it was to the effects of legislation.

JOHN BURNETT.
Hurst Lodge,
Grantley Close,
Shalford, Surrey.

(*Left*): **The main entrance to the College.** (*Right*): **Aerial view of the College.**
(*Courtesy "The Times" and John Laing and Son, Ltd.*

National College welcomes Prince Philip

Opening ceremony on December 16

POSTPONED from February 19, the visit of H.R.H. the Duke of Edinburgh to the National College of Food Technology, Weybridge, took place on Friday, December 16. Promptly at 11.30 a.m. his red helicopter landed on the lawn in front of the hostel, and he was welcomed by the chairman of the Board of Governors, Sir Frank Shires, the vice-chairman, Sir John Hammond, and the Principal, Dr. J. D. Mounfield.

After a private reception in the Principal's office, H.R.H. was conducted round the College, visiting in turn the food processing laboratories, the food science laboratories, the lecture theatre and experimental kitchen, and the library. The students had prepared a careful and comprehensive display of all aspects of their work, which the Duke examined meticulously and keenly; nothing escaped his attention and he asked many questions of the students about their work and commented approvingly and with informal good humour. The easy and relaxed atmosphere during the Duke's tour enabled most of the students and those present to speak freely with H.R.H. After lunch in the refectory, H.R.H. inspected the hostel.

Prince Philip questions Michael Alderson of Bishop Auckland, Co. Durham, about the operation of a continuous sugar boiler, while Dr. Mounfield looks on.

In his address of welcome in the Assembly Hall, Sir Frank Shires paid tribute to Dr. J. D. Mounfield. In his address the Duke said that without the resources of modern food technology it would be impossible to keep the populations of our big cities fed. He mentioned that food is a constant factor in our balance of payments, that half of it is imported, and that a large part of the food industry in this country is in direct competition with abroad. He said that the College has a great future in the service of a vital industry, and formally declared the College open.

ADVANCES in FOOD TECHNOLOGY

BLANCHING

Application of infra-red

Three types of high energy, infra-red radiators—quartz lamps, quartz tubes, and calrods—were evaluated for their effectiveness in blanching apple tissue. Data are presented which show how the depth of heat penetration was influenced by the wavelength characteristics, voltage input, and energy output of the radiator. Infra-red radiation was used successfully for blanching celery, apples and peas before freezing and in the preparation of fried potatoes. General quality of infra-red-blanched samples was better than that of samples blanched by conventional steam or boiling water methods. Accompanying weight losses of up to 35% by weight would result in reduced freezing, storing, and handling costs in the case of products intended for later manufacture. Infra-red was substituted for the parboiling treatment of beef as preliminary heat treatment in preparing beef stew. The colour, texture and flavour of the infra-red-braised canned meat was considered superior to that of parboiled meat.—E. A. Asselbergs *et al.*, *Food Technology*, 1960, **14**, 449.

BREAD

Disappearance of bromate during baking

The amperometric titration method was applied to the study of the disappearance of bromate during baking of bread from bromated flour. For initial potassium bromate concentrations of 5 to 40 p.p.m., essentially no bromate was found in the bread crumb after a 10 min. baking period. For 80 p.p.m. a small amount of bromate was found after 15 min. baking time; none was found after 20 and 25 min. Similar results were obtained for bread baked according to the formula of Lee *et al.* from flour containing 20 and 40 p.p.m. potassium bromate. Additional experiments by Lee and Tkachuk have reconciled their previous findings with those of this study.—L. C. C. Lee and R. Tkachuk, *Cereal Chemistry*, 1960, **37(4)**, 573.

CANNING AND FREEZING

Factors affecting cherry quality

Factors found to influence the firmness and drained weight of frozen or canned cherries are time elapsed between harvest and packing, degree of bruising, and fruit maturity. Prolonged holding time provides progressively higher character scores and drained weights in the processed products, whereas the ripening of the fruit has opposite effects. Although bruising also tends to augment firmness in the final product, it has the disadvantage of promoting decidely greater scald. No difference was found between the firming effects of holding in air as compared to soaking in water. Neither were any significant differences in firmness observed when holding or soaking temperatures of 40 and 80°F. were compared. The higher temperature merely encouraged scald damage. In general, conditions which favour high drained weight and firmness in red tart cherries are also conducive to scald and adversely affect colour. As a compromise between these two quality objectives, it is suggested that cherries be handled with minimum bruising and be promptly chilled and soaked in cold water for moderate periods of 4 to 10 hours.—R. L. LaBelle and J. C. Moyer, *Food Technology*, 1960, **14(7)**, 347.

COOKING

Microwave v. conventional ovens

The heating efficiency of microwave and conventional cooking equipment in the heating of water and the roasting of beef was studied. In heating water, the overall electrical efficiency was 34% for both microwave and conventional ovens, but the efficiency of a conventional hot-plate in heating water was 63%, virtually double that of the ovens. In roasting 8 lb. ribs of beef, the overall electrical efficiencies were 36·7% for the conventional and 33·4% for the microwave oven. However, the product prepared in the conventional oven yielded 13% more edible meat using 24% less electrical energy. A better way of expressing the energy-yield relation is the energy required to prepare a unit weight of edible product. This was found to be 74 B.T.U. per oz. of yield for the conventional as compared with 119 B.T.U. per oz. of yield for the microwave oven. The difference in energy was attributed primarily to energy required to evaporate a greater amount of water in microwave cooking.—G. A. Pollak and L. C. Foin, *Food Technology*, 1960, **14**, 454.

DEHYDRATION

Vacuum drying of meat over silica gel

The German Federal Meat Research Institute, Kulmbach, has investigated a new method of manufacturing dehydrated meat where fresh or processed meat is dried under vacuum at temperatures up to 36°C. above strongly dehydrating substances such as silica gel. Dehydrated meat thus prepared is suitable for the preparation of cooked and fried meat dishes and soups. Because of its nutrient contents, the rehydration liquid should also be used. For pre-cooked dehydrated meat, the rehydration period is much shorter than for dehydrated meat manufactured from fresh meat. If kept under vacuum or nitrogen, either in cans or in combined foils, the product is well suited for storage.—R. Grau and A. Schultheiss, *Die Fleischwirtschaft*, 1960, **12**, 827.

Continuous process for honey

A continuous process has been developed on a pilot-plant scale for producing dried honey. The product has colour and flavour quite close to that of the original honey; has free-flowing, granular physical form; and has long shelf life. It can be produced from both table and baking grades of honey, either with or without the addition of sucrose before drying. Addition of sucrose raises the temperature at which the dried product will soften and makes it more resistant to caking at elevated temperatures. Honey essence of high potency and true aroma character can be obtained as a by-product. Estimated costs of making the dried honey on a commercial scale are presented. The dried honey has applications in commercial baking, in confectionery making, and in the production of packaged dry baking mixes.—V. A. Turkot, *et al.*, *Food Technology*, 1960, **14**, 387.

FREEZING

Doughnuts

In freezing packaged doughnuts, forced air circulation at rates exceeding 500 linear feet per minute do not appear to produce additional benefits in lowered rate of freezing. For doughnuts to be stored at 0°F., freezer temperatures of −10°F. or −20°F. will materially lower the freezing time. There is a material gain in speed of defrosting through use of elevated temperature (115°F.) and forced air circulation at 500 ft./min. Freezing and defrosting lowered the freshness of doughnuts, but had far less effect than standing at room temperature for 24 hrs. Within the limits employed, differences in freezing and defrosting time had only minor effects on freshness or firmness of doughnuts. If speed of freezing is of major importance, doughnuts may be frozen unwrapped with little moisture loss. Appreciable moisture loss occurs during defrosting of unwrapped doughnuts and this practice is not recommended. For frozen storage the temperature 0°F. appears adequately low. Above this temperature doughnuts become stale and firm rather rapidly.—W. G. Bechtel and K. Kulp, *Food Technology*, 1960, **14**, 391.

FREEZING

Blanching of green beans

During recent years, defects in texture and flavour have developed in some lots of green beans in prolonged (6 months or more) frozen storage. These defects are reminiscent of underblanching. Attention is focused in this paper upon several factors which might influence the inactivation of the enzyme peroxidase by blanching. Small but marked differences in the time of blanching of green beans suitable for freezing processing have been observed. The differences are associated with variety of the bean. Climatic conditions such as relatively dry season *vs* one of normal rainfall as prevailed during the two years of this study, the temperature of the cooling water, salts in the blanching water, and the stage of maturity in which the beans are very young or are fully ovulated, appear to have little influence upon the time of blanching. It is suggested that the time of inactivation can be extrapolated from accurately determined lower temperatures by means of the equation, $t = t_o e^{-rT}$—J. Orvin Mundt and I. E. McCarty, *Food Technology*, 1960, **14**, 309.

Biochemical changes in protein and fat

In the practical application of food freezing methods, certain changes to the protein and fat constituents are unavoidable, and are liable to affect the appearance, smell, taste and colour of the food. Having surveyed these phenomena, the author arrives at the conclusion that, although these phenomena themselves as well as a number of remedies are well known, our knowledge of the biochemical changes during freezing is still very deficient. Similarly, our knowledge of the physical changes is still not adequate to provide a full explanation of all the phenomena encountered during food freezing. It is, therefore, still necessary to carry out extensive research before a comprehensive theory of all changes caused by freezing can be established.—J. Kuprianoff, *Kältetechnik*, 1960, **12**, 284.

HANDLING

Improving meat packing and transport

Conditions in the German meat industry suggest that there is still a considerable margin for improving the economic efficiency in the packaging and transport of meat products. The premises are often too small for the purpose, and much of the internal transport is still done by hand. This has an important bearing on the cost of labour. Efficiency can be improved by making more use of mechanical handling devices, *e.g.* loop conveyors which work not only horizontally but also vertically or inclined, collecting the different products from their respective stores. Sections with different air conditioning can be partitioned by air curtains or locks. Labour can also be saved by using weighing machines with automatic invoicing equipment.—G. Becker, *Die Fleischwirtschaft*, 1960, **12**, 736.

MICROBIOLOGY

Recognition of bacterial colonies

After plate cultures of food products have been prepared in accordance with standard methods and incubation has been completed, the ease of colony recognition is a function of sample dilution. To the naked eye, the medium in which bacterial colonies have grown may vary from total opacity to complete transparency. In cultures prepared from low dilutions of food products, bacterial colonies may be masked by food particles or food particles may appear to be bacterial colonies. To eliminate these problems, the Tetrazolium Flooding Technique was developed. In this method, each culture of plated food material, after proper incubation, is removed from the incubator and flooded with 2 ml. of a 0·1% aq. soln. of 2,3,5-triphenyltetrazolium chloride. The flooded plate is gently rocked back and forth and from side to side several times so that the entire area is covered by the solution. The excess solution is poured off, the Petri dish cover replaced, the plate inverted and allowed to remain at room temperature for 3 to 5 hrs. The metabolising bacterial colonies normally reduce the indicated solution within the first hour. The additional time used allows the more slowly metabolising colonies to reduce the tetrazolium and also results in colour intensification within all of the colonies. In counting the colonies an illuminating instrument such as the Quebec Colony Counter can be used except in the case of extremely opaque media.—M. Solberg and B. E. Proctor, *Food Technology*, 1960, **14(7)**, 343.

CEREALS

Yeast growth in doughs

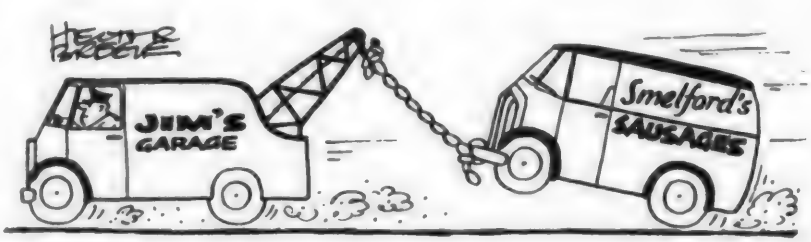
Yeast cells were quantitatively recovered from dough by a process in which the dough was blended, the starch was gelatinised by heat-treatment, and the major part of the starch and protein was solubilised by digestion with fungal amylase and protease. After removal of lipids by an acid extraction with ethanol-ether, a further enzymatic digestion provided a suspension containing the yeast cells but very little extraneous material. The cells were readily counted in a Petroff-Hausser chamber, and buds were easily distinguished. The method was used to determine the amount of growth undergone by compressed and active dry yeasts in various types of commercial doughs. In sponges, both yeasts grew about 50-60% in 4 hours, but no further increase occurred in the sponge doughs. The yeasts grew about 35% in straight doughs fermented 3·5-4 hrs. Most of the bud formation occurred during pan proof. No growth was found in sweet dough sponges or in flour brews fermented 3·5-4 hrs. Because recovery varied during the course of dough fermentation, the nitrogen content of the isolated yeast could not be used as an indication of growth.—J. A. Thorn and J. W. Ross, *Cereal Chemistry*, 1960, **37(4)**, 415.

Italian Confectionery Plant

(*Concluded from page* 18)

workers wear face masks, even though these cover the mouth only and not the nose. Some British equipment, we were glad to see, is in use here, including a Clark-Built instant freezer and Crofts motors for driving the various machines. Three varieties of ice lolly are made—orange, lemon and chocolate.

Machinery generally in the factory is highly modern with that observance of aesthetic appearance which Continentals usually evince in higher degree than ourselves. Much use is made of automatic wrapping machinery; nevertheless, more labour is employed than would be normal in a comparable British factory. Italian wages, however, are lower than ours, and there is some unemployment.



MACHINERY and EQUIPMENT

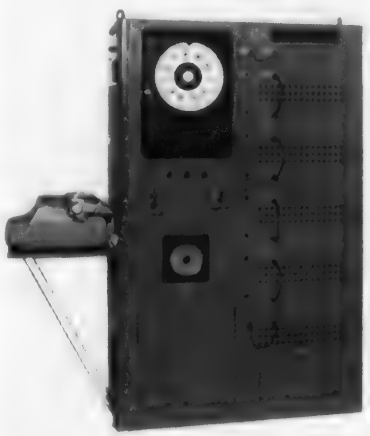
VACUUM CLEANING MACHINES

In addition to the more conventional general cleaning uses, portable vacuum cleaning machines made by the British Vacuum Cleaner and Engineering Co., Ltd., have a number of wider applications within the baking industry. The makers say that the machines are particularly suitable for clearing blockages in air extraction ducting, where flour may cause clogging, and can also be used in reverse to blow flour where it becomes impacted and liable to impair operation of the plant. Where flour storage bins must be cleared completely when changing the mix, these machines are also suitable, as well as for the cleaning and servicing of automatic flour sifting plant and filters.

A B.V.C. portable vacuum plant in use at Cadby Hall to ensure that every particle of surplus flour is removed from a blending unit before starting another batch in which a different blend of flour will be used.

DATA PROCESSING SYSTEM

A Ferranti *Orion* data processing system recently ordered by the Beecham Group, Ltd., will be used for the production of sales and marketing statistics, and for invoicing, customer accounts and stock control. Data will be filed on high-speed magnetic tapes: peripheral equipment in the installation will include six high-speed magnetic-tape units and also fast line printers for data output. The computer has been so designed that its facilities can be easily extended if necessary, and the system is said to be sufficiently powerful to deal with other applications. The computer itself is a high-speed, fully transistorised machine with a time-sharing method of operation which enables several programmes to be run concurrently.



Automatic temperature logging equipment by Foster Instrument Co.

AUTOMATIC TEMPERATURE LOGGING

Inexpensive and technically simple automatic equipment for measuring and recording the temperature at a large number of stations in a process has been produced by the Foster Instrument Co., Ltd. Each unit is individually tailored to customers' requirements; the particular equipment illustrated is compact, measuring 5 ft. 9 in. high, 5 ft. wide including the typewriter stand, and 1 ft. 9 in. deep. Power consumption is 400 watts.

The instrument is connected to each thermocouple station automatically and the temperatures of 208 thermocouples are indicated in turn on the circular indicator. The temperature of each station and its respective index number is printed automatically by an electric typewriter. The scanning of the stations can be arranged to be continuous or to reoccur at preset time intervals. In addition, external links can be rearranged so that only a proportion of the thermocouples are scanned. Jack plugs are provided so that any thermocouple may be connected manually to a separate recorder if a continuous record of its behaviour is required.

Many additional facilities may be incorporated. Resistance bulbs, or a combination of these and thermocouples, may be used as the sensitive elements instead of thermocouples. The equipment may be used to record the values of quantities other than temperature if an appropriate sensing element is used. The circular indicator may be replaced by a recording instrument, and alarm contacts can be fitted to give audible and/or visual alarm when temperatures are outside predetermined limits. The typewriter may be replaced by a tape punching machine, an in-line digital indicator, or a single column numerical printing machine. Many other facilities can be provided, including those to suit particular requirements.

PROCESS TIMERS

A new miniature electronic timer has been added to their existing range of timers by Elcontrol, Ltd. The new units operate on the same electronic principle as the larger versions, and are said to give a high repetitive accuracy in a much smaller form at lower cost. The miniature timers are housed in small, robust plated and stoved steel cases, with an overall size of only $7\frac{1}{8}$ in. $\times 6$ in. $\times 5\frac{1}{4}$ in. Accuracy is said to be better than $\pm 1\%$ within normal mains voltage fluctuations, and better than $\pm 2\%$ within mains voltage fluctuations of -20% $+5\%$. Control knobs

on these models are accessible only when the cover is removed. They are said to be very easy to instal and are available in three wide timing ranges, covering up to 5 mins.

AIR BLOWERS

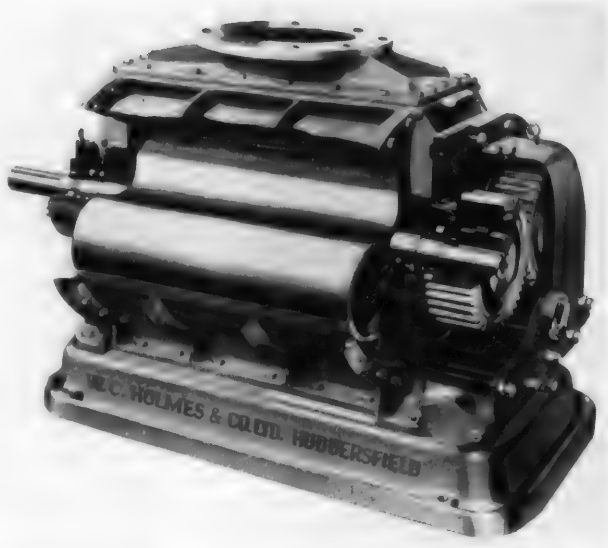
Recent modifications to the range of type RBS Holmes-Connersville positive air blowers have resulted in an increase in the allowable pressure loading on each size of machine. Maximum pressure for some sizes has been increased from 10 to 15 p.s.i. These blowers are now constructed with air gaps which completely isolate the bearing housings and gears from the casing, which, the makers say, ensures that under no circumstances, even in the event of an oil seal failure, is it possible for air passing through the blower to become contaminated with oil or oil vapours. This range of blowers can also be fitted with mechanical shaft seals when handling gases other than air, which, it is claimed, are considerably more efficient than the stuffing box and gland previously used. Makers are W. C. Holmes and Co., Ltd.

STRIP-PACKAGING MACHINE

A new addition to the range of *Wolkogon* strip-packaging machines has been announced by the Packaging Division of Gordon and Gotch, Ltd., first U.K. agents for the range.

The new machine, the M/3, can be used for packaging chewing gum, tablets, dragees, capsules, in fact most products within its size limitations. It can handle round products $\frac{1}{4} \times 2\frac{1}{4}$ in. diameter, and rectangular products $2\frac{1}{4} \times 2$ in. wide up to a maximum thickness of $\frac{1}{8}$ in., at an output rate of 50/60 per minute. Other shapes and thicknesses can be packed subject to examination.

Incorporating adjustable devices for cutting, both vertically and horizontally, the M/3 can use all heat-sealable materials. It automatically counts, perforates, centres printed material over contents, and impresses "easy to tear" notches adjacent to each item if required. It is supplied ready for use with one-third h.p. motor and electrical fittings.



A cut-away view of a size 10 in. Holmes - Connersville positive air blower type RBS.

GLANDLESS CHEMICAL PUMPS

The *Perfecta* range of glandless chemical pumps, manufactured by K. Rütschi, is particularly suitable for the handling of toxic fluids, acids, etc., and models are also available for operating temperatures from −40°C. to +400°C. The pump is self-lubricating, and is said to require no maintenance beyond a check-up once every 12 to 15 months. Models are available for various purposes, and can be supplied up to 100 h.p. The *Acitherm Perfecta*, for temperatures up to 400°C., incorporates a small auxiliary impeller which circulates the lubricating liquid through the coils to ensure effective cooling of the motor. The coils are arranged around the motor in a water jacket which serves to cool the stator as well as the coils, thus avoiding undesirable temperature drops of the liquid.

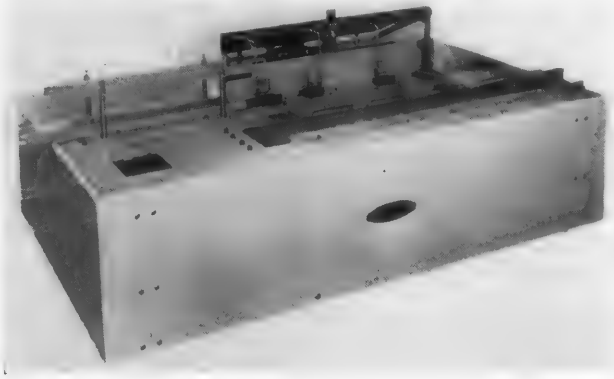
The sole distributors in the U.K. are Mason and Morton, Ltd.

HOPPER LEVEL SWITCHES

Two types of diaphragm hopper level switches have been developed by Firth Cleveland Instruments, Ltd., designed to shut off the flow of granular or semi-solid material into a hopper, bunker or silo, when the level of the material reaches a height predetermined by the mounting position of the switch.

Type HS 1017/1, recommended for open hoppers, consists of an aluminium-alloy housing which is mounted on the wall or sloping floor of the hopper, the inside face being sealed by a strong synthetic-rubber diaphragm.

Type HS 1017/2 is for use in enclosed bunkers where the switch diaphragm may in some cases be exposed to a pressure differing from atmosphere; where, for example, light materials are conveyed by forced or induced draught, and changes in pressure applied to the diaphragm might cause spurious operation of the switch. To enable the switch to distinguish between the pressure of the material and the abnormal air pressure in the hopper, the latter is fed also to the back of the diaphragm, and so becomes self-balancing.

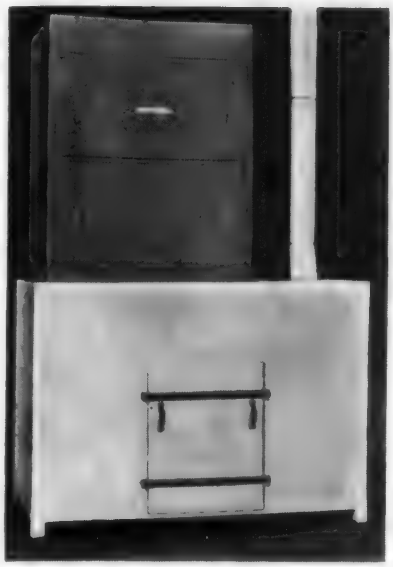


The "Hy-Tra-Lec Hydra" check weighing unit has 4 weighing heads and can handle 160 cans per min.

HIGH SPEED BOWL CUTTERS

Two high speed bowl cutting machines which are claimed to be the fastest in Europe are the PB 125 and PB 200 Alpina machines of 125 and 200 litres capacity respectively. These are the latest developments in the Alpina range, the agents for which in this country are Albrin Products, Ltd. The machines were recently exhibited at the Zürich Butchery Exhibition.

Of massive construction with totally-enclosed base, they are claimed to be easily and quickly cleaned and to be easy and safe to operate by means of automatic switchgear, mechanical cover-lock and foot-operated clutch. The clutch enables the load on the machine and on the mains supply to be reduced while at the same time allow-



A Dallow Lambert " Unimaster " type 250 H mounted on a dust collection chamber made of wood and chipboard.

ing the machine to be stopped in the shortest possible time. Both machines have a 3-phase motor (30/55 h.p. on the PB 125, 45/75 h.p. on the PB 200) equipped with adequate cooling and coupled to a 2-speed gearbox, bowl rev. counter and a massive tipping and discharging mechanism which makes each machine suitable for production of cooked or raw sausage fillings to any desired degree of fineness. Also provided are a stainless steel bowl cover and a built-in thermometer.

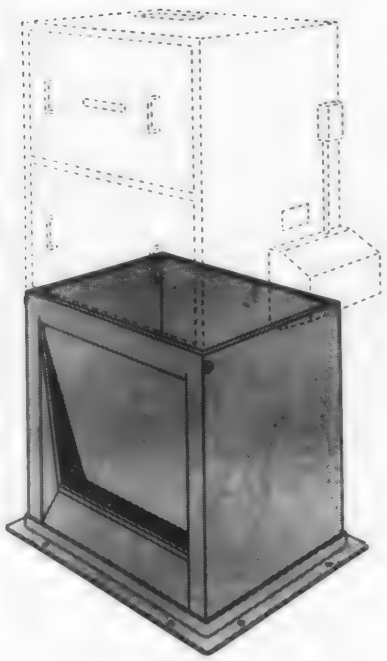
DUST CONTROL

A 4 cu. ft. dust container is generally regarded as the maximum convenient size for manual handling. Bulky or granular materials demand special consideration in the case of unit dust collectors and to deal with problems of this nature the Dallow Lambert *Unimaster* H type model is available.

This feature is a conventional dust control unit in the *Unimaster* range, fitted with an angle flange at the base of the filter chamber. This adaptation allows the unit to be mounted on large storage containers which can be made up from any material such as timber, chip board, sheet metal, etc., always providing they are airtight. The illustration shows a model 250 H dust control unit mounted on a dust storage container made from chip board and timber. The container holds a large quantity of the collected product and, as can be seen, a door can be easily fitted for periodic emptying.

This H type unit can also be fitted on top of hoppers with rotary valves for tailing the collected dust back into conveying systems.

These dust control units are available



A Dallow Lambert sack tipping attachment.

in 70, 100, 150 and 250 series (70-250 sq. ft. of filter area) with fan capacities up to 2,000 c.f.m.

MIXERS

Among the range of vertical mixing machines produced by Aktieselskabet Strømmen and distributed in the U.K. by the Alexandra Separator Co., Ltd., are models designed to deal with a wide range of foods. The Type 21.12 is for mixing, whipping and kneading, and can be equipped with meat mincer, almond shredder, vegetable cutter, soup strainer, coffee grinder, etc. The machine has an adjustable bowl suspension, and bowls are supplied in 12 and 16 litres capacity. The unit has an infinitely variable gear and automatic lubrication by circulation from an oil bath in the gearbox. Height is 37 in., depth 26 in. and width 22 in. It is driven by a ½ h.p. motor and weighs 310 lb.

Type 343.03 is designed for dough, margarine, etc., and is fitted with two zigzag arms which rotate in opposite directions at different speeds. The mixing arms are connected at one end by gearwheels in an independent gearbox outside the machine. The mixer is emptied by hydraulic tilting, and can be supplied with a rubber sealed lid. Other alternative fitments are a trough and lid in reinforced construction to enable the machine to be used as a vacuum mixer, and a jacket which can be used for either steam heating or water cooling. The mixer has a 44-gal. capacity and weighs 32 cwt. Length is 5 ft. 10 in., width 3 ft. 2 in. and height 3 ft. 9 in.

INDUSTRIAL FLOOR COATING

An epoxy resin-based flooring material which was publicly shown for the first time at the Corrosion and Metal Finishing Exhibition recently has been developed by Evode, Ltd. Called *Evoscreed*, the material is applied with a trowel to a thickness of about ¼-½ in. to any hard floor of any material. The manufacturers say that there is no need to move machinery, and the coating dries hard enough to take light traffic after 6-8 hours. Shrinkage is said to be negligible, and the flooring is available in a range of colours. A jointless flooring of dense texture is produced, with a high degree of resistance to attack by acids, solvents, fats, oils, chemicals and water. The flooring is said to withstand heavy abrasion, point loading, impact and very heavy traffic, and to be easy to clean.

CHECKWEIGHERS

Following many months of experience with a prototype at one of the Schweppes factories, Industrial Products (Speco), Ltd., plan to put their *Hy-Tra-Lec Hydra* 4-headed checkweigher into full production next year. This machine check-weighs cans at a rate of up to 160 c.p.m. The company also plan to manufacture in this country a range of Wright Machinery Co. automatic weighing equipment, including first the *Wrightronic* checkweigher operating on electro-mechanical principles and later the *Bagmaster* model H, which automatically weighs and fills bags for such products as potato crisps. Improvements to existing models in the firm's range include an electro-mechanical feed on the *Crossbow* 4 which has a weighing speed of 50 packs per min.

NEW HOPPER LOADING UNIT

A new hopper loading unit for use in the biscuit and bread bakery has been produced by T. and T. Vicars, Ltd. The unit consists of an elevating and tilting assembly operated by an electro-hydraulic power unit. The *Hyvolta* Mark I has a single hydraulic ram for somewhat lighter loading than the Mark II model, which has twin rams.

Operation is simple. The loaded container is wheeled into position on the load forks and by push-button control the container is elevated, tilted, emptied and returned to floor level. At this point the electric current releases the interlocked access gate which can then be opened and the empty container removed.

The unit occupies relatively little floor space and is claimed to be silent in operation.

▶ A leaflet issued by W. C. Holmes and Co., Ltd., outlines the design, performance and principle of operation of the Holmes-Connersville cycloidal vacuum pumps.

PACKAGING

Fibreboard clad polythene container

Following the recent announcement that the Reed Paper Group has entered the plastic packaging field, Reed Corrugated Cases, Ltd., is now marketing a new non-returnable polythene inner container held in a specially designed carrier of corrugated fibreboard complete with separate carrying and pouring grips. The whole unit is fitted into a normal one-piece fibreboard outer transit case, and is designed for carrying a wide range of products in liquid and loose powder form.

Great strength and rigidity are provided by the four thicknesses of heavy board at the top and base and double thickness on the four walls.

The polythene vessel is manufactured by the new company, Reed Plastic Packaging, Ltd., and is a light thin-walled vessel of one-piece seamless construction. Its integral screw-necked filling and pouring aperture is claimed to avoid spillage even when dispensing very small quantities of the contents. Screw caps giving a re-sealable closure are of high-density polythene incorporating a flange giving a positive leak-proof seal.

A 5-gal. size is immediately available and shortly a range of sizes, including some specifically designed for export purposes, will be introduced. The composite container has been fully approved by the Railway Clearing House for the carriage of non-dangerous goods.

The new Reedac fibreboard - clad polythene container for liquids and loose powders. Pouring aperture has been designed to avoid spillage when pouring even small quantities of the contents.

Brighter pack for eggs

A new pack recently demonstrated by the British Egg Marketing Board and claimed to give increased sales appeal to eggs consists of a standard six-egg retail pack and a lightweight paper band litho-printed in light blue, brown and red with an illustration and description of the contents. The band is covered with a heat-sealed sleeve of transparent *Cellophane* film (MSAT 300) which keeps the lid of the container and the card band securely in place, and by adding sparkle and brilliance to the colour printing stimulates self-service presentation. Wrapping and heat-sealing operations can be carried out on a modified BCL multi-packaging aid. The Egg Marketing Board suggest that the pack might be improved and simplified by using reverse-printed film or sandwich-printed laminates.

This method of wrapping egg packs in "Cellophane" was demonstrated recently at the Dairy Show.

New polythene film for bread wrapping

A new and special grade of *Pliofilm* for wrapping bread and baked goods is 65 B.G. made by Goodyear, who say that trials recently carried out by the Forgrove Machinery Co. on their BW5-P machines were very successful, excellent seals being obtained over a wide temperature range, with no sticking or plucking as the loaf left the belt. The tests were carried out at the normal bread wrapping speed of 30 loaves per minute. The yield cost is 0·25d. per 100 sq. in.

Mustard packs

Contemporary mustard packs made of polythene and containing 4 oz. of mustard retailing at 1s. are the latest idea of Mr. Edward Hack, who introduced the polythene lemon filled with juice. Obtainable in two colours—red, containing French mustard, and yellow, filled with mild mustard—they contain a selected mustard which is shipped from Dijon to Evans Chemi-

(Top): *The Metal Box Co. are supplying this attractive display tin to hold samples of Fox's biscuits carried by their own and their wholesalers' travellers. The container measures* 9⅛ × 8½ × 1 *in., is double seamed, has neat radius corners and is fitted with a slip lid for easy opening.*
(Bottom): *This pack is another example of high-class printing by the Metal Box Co. of a design produced in their own studios. The carton is made by the company's paper group for Macfarlane Lang's "Polo" coconut crisp biscuits. It is printed in four colours offset Litho. The carton is made of manilla folding board.*

A 10½ gal. polythene bottle made by Cascelloid inside a plywood case specially designed by Venesta Plywood, Ltd., forms the new lightweight low-cost container with which Bulmers are replacing wooden casks for their apple drink concentrate.

cals, Ltd., who fill the polythene containers direct from the casks. The packs, made by Cascelloid, Ltd., are marketed by Hax, Ltd.

Foil for chocolate wrapping

A new approach to block chocolate marketing has been launched with the appearance of *Galaxy* and *Romance*, produced respectively by Mars, Ltd., and Rolls Confectionery, Ltd. Breaking new ground in being larger than the traditional 6d. block and retailing at 9d., they each have an inner wrap of embossed aluminium foil produced by Venesta Foils, Ltd. The foil wrap has a distinctive appearance additional to its function as a moisture, odour and light barrier. Foil thicknesses are 0·009 mm. for *Galaxy* and 0·012 mm. for *Romance*.

Plastic and plywood fruit juice container

Claimed to be 40% cheaper than a comparable wooden cask, a plastic and plywood composite pack is replacing wooden casks for nearly all home consignments of *Cidona* apple drink concentrate made by H. P. Bulmer and Co., Ltd. Sterilisable and rectangular in shape, the container comprises a blow-moulded 10½ gal. polythene bottle totally enclosed in a plywood case. It avoids one of the major disadvantages of a wooden cask, that fruit concentrates of high sugar content tend to desiccate the wood of casks, causing them to leak by shrinkage.

These mustard containers are made from Bakelite polythene by Cascelloid, Ltd.

The high-density polythene bottle is made by Cascelloid, Ltd., and the plywood case by Venesta Plywood, Ltd. The users say that nearly all the containers supplied under the original pilot order in 1956 are still in service, the only failures being those damaged by accidents or by unusually rough handling. The case is made from resin-bonded 6 mm. plywood varnished inside and out. The screw-capped bottle, which will withstand temperatures up to boiling point, is completely enclosed but is readily accessible and removable by means of the case's full-width hinged lid which is normally wired shut in transit. No internal cushioning is needed as the case, measuring 15½ × 11½ × 25½ in. internally, fits the bottle exactly.

These new chocolate packs have decorative inner wraps of embossed aluminium foil made by Venesta Foils, Ltd.

NEWS DIGEST

Bread and Flour

Food Standards Committee report

A report by the Food Standards Committee makes recommendations for control over the composition, description and labelling and advertising of bread and flour. The report takes account of evidence received from the food industry and other interests, including those concerned with the enforcement of food and drugs legislation.

The main recommendations regarding bread are that there should be a statutory permitted list of the ingredients which may be used in bread; that descriptions of "protein" breads should be controlled; that slimming claims in connection with bread should be controlled; and that exaggerated claims for enrichment of bread or for energy-producing qualities should be prohibited.

The committee recommends that the present regulations which require all flour to contain specified amounts of vitamin B_1, nicotinic acid and iron and the addition of chalk (*creta praeparata*) to all flour except wholemeal flour, should be continued for the present and that no change in the prescribed levels of nutrients and chalk is required; that the sampling of flour to ensure that it complies with these regulations should be confined to mills and docks; and that only certain bleaching and improving agents should be allowed for the treatment of flour.

Publication of the report does not commit Ministers, and before deciding whether and to what extent the recommendations should be implemented, they will give full consideration to any representations made by interests concerned. Such representations, from any part of the United Kingdom, should be addressed to the Assistant Secretary, Food Standards Division, Ministry of Agriculture, Fisheries and Food, Great Westminster House, Horseferry Road, London, S.W.1, to arrive not later than February 17, 1961.

British firm to equip Moscow bakery

A contract worth £127,000 has been awarded to Baker Perkins (Exports), Ltd., for the supply of plant to handle and store flour in a Moscow bakery.

Although Baker Perkins, Ltd., have supplied many British bakeries with such plant, this is the first order of its kind from Russia. When completed, the installation will have a total storage capacity of 420 tons and will include five automatic weighers with a mechanism for recording each weighing.

A Baker Perkins plant engineer, Mr. M. M. McCulloch, A.M.I. Plant E., flew to Moscow recently to discuss the installation with Russian officials and finalise plans for the erection of the plant. The Russians themselves will make the steel storage silos and supply the pipework to Baker Perkins drawings.

Piped heat

The first issue of a news-sheet devoted to industrial uses of gas and intended for circulation among industrialists and heads of large businesses in the North West has been published by the North Western Gas Board.

The new publication, called *Piped Heat*, and believed to be the first of its kind ever produced within the gas industry, sets out to describe briefly and in non-technical language in each issue three or four interesting new applications of gas in industry or big business.

Fat bloom on biscuits

The British Baking Industries' Research Association has just issued to its members a study of the factors affecting fat bloom on biscuits. Fat bloom, a long-standing problem of biscuit manufacture, often appears haphazardly as a greyish-white discoloration on the surface of a wide range of biscuits, though more often in those of higher fat contents. It seems to be associated with the appearance of solidified fat on the surface of the biscuit, and investigations so far have therefore been concentrated on the effects of different types of fats in short-sweet biscuits.

It has been found that there are marked differences between the liability of fats to produce bloom. An important conclusion is that the degree of hardness, as measured by solids index, can be roughly correlated with tendency to bloom. With single fats it might be possible to state a maximum desirable solids index depending on the type of biscuit and manufacturing process, above which there will be the likelihood of bloom. The situation, however, may become more complicated when blends of several fats are used.

Remploy, Ltd.

An increase of nearly £1,000,000—about 23% over the totals for the previous year—brought the sales of Remploy, Ltd., for the first time well over the £5,000,000 mark during the year ending March 31, 1960, it was announced by the chairman, Sir Alec Zealley, at the company's recent annual general meeting.

For the first time, sales have exceeded the cost of wages paid to disabled workers, plus the cost of raw materials, enabling the company to make a reduction in the Government's grant by £91,000 compared with 1958-59.

Among products manufactured at the company's 90 factories in England, Scotland and Wales are industrial shelving and furniture, cardboard boxes and cartons, a wide variety of packaging and display outers, and protective clothing and industrial gloves. The Sponsorship Scheme, under which production for other industrial concerns is undertaken by Remploy, had contributed nearly £500,000 to the year's revenue, said the chairman, and it was hoped that with the continued improvement in trading it would be possible to make a progressive increase in the number of disabled persons employed.

New, modern factories have replaced inadequate accommodation at Barrow and Halifax, and a new factory is being erected at Wythenshawe, Manchester, for the company's printing works.

Mr. H. J. Heinz II, president of the H. J. Heinz Co., presents a gold watch to Mr. Leslie Semple, who has completed 40 years' service with the company, and who was among 125 Heinz employees to receive long service awards. Mr. Semple received his first gold watch 20 years ago from Mr. Heinz's father.

Sir Alexander Fleck (*extreme left*) **talks to two visitors from Nigeria at the Corrosion and Metal Finishing Exhibition. On the right is Mr. W. Leonard Hill, Chairman of the Leonard Hill Technical Group, publishers of "FOOD MANUFACTURE."**

Corrosion Exhibition attracts wide interest

The Corrosion and Metal Finishing Exhibition, held at Olympia, London, from November 29 to December 2, drew a large attendance on each day, including many visitors from overseas.

The exhibition was opened by Sir Alexander Fleck, K.B.E., F.R.S., President of the Society of Chemical Industry.

Sir Alexander said that the development of numbers of stainless steels illustrates the opportunities that exist in corrosion studies for empirical practices, although basically corrosion is an electro-chemical phenomenon and little progress can be made by any student of corrosion unless he were a thoroughly equipped electro-chemist. A real contribution to counteract the ravages of corrosion has been made by paints, both traditional and the more recent methacrylate formulations, and by metal finishing and preparation techniques.

Baker Perkins acquisition

Baker Perkins, Ltd., have acquired Alfred Porter and Co., Ltd., and its three affiliated companies, of Stella Works, Stanley Road, Teddington, Middlesex.

Alfred Porter, Ltd., manufacture industrial and commercial refrigerating and dehumidifying plant for use in the air-conditioning, chemical, cold storage, food and dairy industries.

William Douglas and Sons (Engineering), Ltd., another member of the Baker Perkins Group, is also engaged in the refrigeration field and has collaborated for some time with the Porter company.

The operations of Alfred Porter, Ltd., will be integrated with William Douglas, Ltd. Mr. T. E. M. Douglas, managing director of the Douglas company, will be in charge of the joint operation, and Mr. G. F. A. Crook, Managing Director of Alfred Porter, Ltd., will join the Douglas board.

Census of production for 1960

The Census of Production to be taken in 1961 for the year 1960 will be a sample inquiry and the questions asked will relate only to the total value of goods sold and work done, stocks and capital expenditure. An order prescribing the matters about which returns may be required has now been made by the Board of Trade.

The Order, which operates from December 31, 1960, is the Census of Production (1961) (Returns and Exempted Persons) Order, 1960 (S.I. 1960, No. 1978).

Forthcoming Meetings

Institute of Refrigeration, Memorial Building, 76, Mark Lane, London, E.C.3, Thursday, January 5, 17.30: "Use of Two-Stage Freezing procedures for eviscerated chicken," by R. Gane and D. H. Shrimpton.

S.C.I. Food Group, 14, Belgrave Square, London, S.W.1, Wednesday, January 25, 18.15: "Some biological effects of heated fats," by Professor A. C. Frazer.

Royal Society of Arts, John Adam Street, London, W.C.2, Wednesday, January 11, 18.00: "Ergonomics—fitting the job to the worker," by C. B. Frisby.

Erections and Extensions

The Union International Co., Ltd., will shortly have an abattoir and ancillary premises built on a site at the junction of Cargo Fleet Lane and South Bank Road, Middlesbrough, Yorks.

*

York Shipley, Ltd., are having a factory for the production of refrigeration machinery built on a 20-acre site at Basildon, Essex.

*

The Squirrel Confectionery Co., Ltd., have had plans approved for the early erection of a two-storey extension to their factory at Stockport, Cheshire.

*

Thomas and Evans, Ltd., mineral water manufacturers, are having a distribution depot built on a site at Cardiff Road, Watford, Herts.

*

Bird's Eye Foods, Ltd., are having a distribution depot built at Lower Sydenham, London, S.E.26.

*

R. A. Dodds, Ltd., have plans in hand for the erection of a meat packing depot at Green Lane, Felling, Co. Durham.

*

H. Rowe, Ltd., are having a soft drinks factory built on a site at Back Condercum Road, Newcastle-on-Tyne.

*

Wiltshire Vegetables, Ltd., are having a packaging factory built on a site at St. Edith's Marsh, Bromham, Beds.

Britain's first fork truck hire service

What is claimed to be the first fork lift contract hire scheme in the country is now offered by George Cohen, Sons and Co., Ltd. The contract covers all aspects of maintenance, and provides "stand-in" trucks in the event of breakdown. Existing trucks may be purchased. The scheme is similar to the contract hire of cars by companies, and has been prepared in collaboration with Coventry Climax Engines, Ltd.

DIOlam—a correction

We regret that on p. 486 of our November, 1960, issue *DIOlam* was erroneously described as made by Metal Box. It is of course made by Transparent Paper, Ltd.

I.C.I. Polypropylene Plant on Stream

11,000 tons a year production of new plastic

Britain's first plant for the bulk manufacture of polypropylene — at I.C.I.'s Wilton Works in Yorkshire— is now operating. The new manufacturing unit, which has a capacity of 11,000 tons a year, will produce I.C.I.'s brand of polypropylene called *Propathene*.

Research and development work by the Plastics Division of I.C.I. on polypropylene has been going on for a number of years. A pilot plant was built in 1957-8, but the building of the main plant could not begin until I.C.I. obtained a licence under the Montecatini and Montecatini/Ziegler U.K. patents covering the production and use of polypropylene. The announcement of this agreement was made in May, 1959.

The main plant has been built at high speed. Work on the site began in May, 1959, and the completion date was set for September, 1960, which was achieved.

Big potential market

Since May, 1959, the Plastics Division of I.C.I. has been developing the U.K. market for polypropylene, mostly obtained from abroad. Some important applications have already been established and manufacturers are now tooling up for many other applications involving large tonnages. As a result of this market development, the plant will be occupied at a profitable level much sooner than if polypropylene was now being introduced for the first time to the market.

The main raw material, propylene, is available from the oil-cracking units already installed at I.C.I.'s Wilton plant. In the "Propathene" plant, propylene is polymerised catalytically under low pressures and at normal temperatures to yield long-chain polymers of polypropylene in which the molecules are arranged in a regular way.

Properties of "Propathene"

"Propathene" is claimed to have a unique combination of desirable properties, having a density of only 0.90 g./c.c., and a m.pt. of about 165°C., which qualifies it for a number of applications where temperatures well above the boiling point of water are used. It also possesses a high degree of rigidity, greater than that of the stiffest commercially available polythenes at room temperature, together with retention of useful strength up to 140-150°C. It also retains adequate strengths for many purposes at sub-zero temperatures.

Being a hydrocarbon, it has a very low moisture absorption. The new polymer is claimed to possess a high resistance to attack by inorganic and organic liquids and to offer complete freedom from the environmental stress cracking failures sometimes observed with polythene.

Polypropylene film is of considerable potential interest because of its clarity and outstanding gloss, stability in service and excellent barrier properties, *e.g.* in the overwrapping of fats. Polypropylene films may be oriented by stretching. Such films show improvements in many properties over the unoriented product, particularly in tensile strength, stiffness, appearance and resistance to the passage of gases. It may well prove to be one of the major developments in packaging materials.

This photo taken recently at a press conference to introduce "Propathene," I.C.I.'s brand of polypropylene, illustrates the high clarity and gloss of the film.

Technical Press Review

Seeds and Grain Handling

This month's issue of **World Crops** contains a special feature devoted to seeds and grain handling. Among contributions to this special review are: "F.A.O. World Seed Campaign," by R. O. Whyte and J. J. de Jong; "Protection of Grain in Storage," by J. P. Brooke; and a report on world crops in 1960.

A safety equipment review is the main feature in **Manufacturing Chemist** and includes an article by V. A. Broadhurst on "Industrial Health Hazards." Other contributions include: "Carbohydrates in the Chemical Industry—2," by Dr. Greville Machell, and "Hydrocarbon Solvents for Locust Control," by A. D. Harford.

Fibres and Plastics has a special review of "Glass Fibre Applications," and there is also an article on "Processing High-Density Polythene."

Petroleum includes articles on "Sizing of Vapour Relieving Systems," by J. Conison, of the Standard Oil Co. of New Jersey, and a review of fire equipment and safety.

"Pumps" are the subject of an editorial review in **Dairy Engineering.** The issue also includes an article on "The Choice of Materials for Pipelines," by H. T. Hoblyn, "The Manufacture of Instant Milk," by Dr. C. W. Hall and Dr. T. I. Hedrick, and "The Big Real Dairy Cream Push on Merseyside," by F. Wynne-Owen.

The ever-present problem of effluent treatment is dealt with in **Chemical and Process Engineering.** Among articles in this review are: "The Luton Experiment—Detergent Treatment for Sewage"; "Aman Process for Treating Acid Pickle Liquors"; and "Microbiological Oxidation of Phenolic Liquors."

Automation Progress contains articles on "The Ubiquitous Photocell," "Computers and the New Technology" and "Hydraulic Servomechanisms—I."

Paint Manufacture includes articles on paint solvents, "Flooding and Floating in Paints," and a report of the American Chemical Society's Conference on High Polymers.

Specimen copies of these journals can be obtained by writing to the Circulation Manager, 9, Eden Street, London, N.W.1.

All books reviewed in FOOD MANUFACTURE as well as any other scientific or technical book may be obtained from:
Technical Books
308, Euston Road
London, N.W.1.
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Prompt attention is given to all orders.

Food in Parliament

The food industries, recognising that good hygiene was also good business, had in general been most co-operative in bringing home to their employees the importance of cleanly practices, said Miss Edith Pitt, Parliamentary Secretary to the Ministry of Health, in the Commons recently.

She added that the full purposes of the food hygiene regulations would not be achieved until every food handler, and every customer, too, was so well aware of the importance of good hygiene that correct practices became a matter of course.

When an M.P. pointed out that in 1957 about 14,700 people were affected by food poisoning and the following year 17,500, Miss Pitt replied that it was true there had been an upward tendency in notification, which might be the result of a great deal more publicity and more intensified effort.

Date marking suggestions rejected

Turned down was a proposal that the regulations should be amended to make compulsory the printing on packages of pre-packed perishable foods the date of manufacture and the latest date on which the food could be safely consumed.

Mr. Christopher Soames said that the date of manufacture was not a sure guide to the condition of the food at the time of retail sale, because the food could be affected by factors outside the manufacturer's control such as the storage conditions and the weather during distribution. For the same reason, the latest safe date for consumption could not in general be determined at the time of packing.

When M.P.s complained that pre-packed meat and other products could be sold in a state of de-composition, the Minister pointed out that the consumer was protected by the Food and Drugs Act, 1955, which made it an offence to sell food which was unfit for human consumption in any way.

B.I.B.R.A.

New biological research laboratories at Leatherhead costing £56,000 will be used mainly to investigate the effect on health of substances used in food manufacture, or which may find their way into food from things such as pesticides, packaging materials or utensils, Parliament was told. The research station is being planned by the British Industrial Biological Research Association.

The Leatherhead site was chosen to enable some facilities to be shared with the British Food Manufacturing Industries Association. It has the additional advantage of being near the Medical Research Council's Toxicological Unit at Carshalton.

On Friday, November 18, His Royal Highness the Duke of Edinburgh paid a private visit to Birds Eye Foods, Ltd., factories at Lowestoft and Yarmouth. Here, the Duke is talking to a woman worker in the brussels sprout department.

A.F.D. research

Among projects undertaken in the last 12 months at the Aberdeen Research Station—now to be closed down by the Government—were (1) the installation and operation of the Mark 1 commercial prototype accelerated freeze drying cabinet loaned to the Agriculture Ministry by Armour of Chicago; (2) the production of field trial samples of the various foods processed by the accelerated freeze drying method and the production of experimental rations for large scale trials by the armed services; (3) work on the quality and storage of dehydrated foods and on the control of the hygienic conditions in the machines used; (4) research into the problems of flavour in vegetable products and investigations into the problem of identifying vegetable flavours; (5) the investigation of enzyme activity in dehydrated raw meats with low moisture content and of the reasons why dehydrated raw meat deteriorates more rapidly than dehydrated cooked meat.

Leading members of the food industry went to a special screening of the latest film in the Rank Film Distributors "Look at Life" series—"Making a Meal of it" on November 22. Among the large audience at the RFD private theatre, Wardour Street, were the French Ambassador, Monsieur Jean Chauvel, G.C.V.O., and Lord Balfour.

Many of the guests at the preview had co-operated in the making of the film which gave a fascinating glimpse into modern methods of food preparation, packing and preservation.

In the picture are (l. to r.) Lord Balfour, Mr. George Grafton Green (executive producer, "Look at Life"), and Mr. Edward Hack (managing director, Accelerated Freeze Dry, Ltd.).

Gordon and Gotch buy Bubblepak

Gordon and Gotch, Ltd., has bought the business of Transparent Plastic Containers, Ltd., manufacturers of *Bubblepak*. The company is now registered as Gordonia Packaging, Ltd. Its manager is Mr. R. A. Hardiman.

OVERSEAS NEWS

New Swedish starch factory replaces 11 others

A new central starch factory replacing 11 small factories previously in operation was opened at Mjällby, South Sweden, recently. Known as the Lister plant, it forms part of the modernisation and concentration scheme in the Swedish starch industry being carried out by the Swedish Starch Producers' Association, which in the past ten years has reduced the number of starch factories from 130 to 54.

The plant, situated in one of Sweden's major potato-growing areas, has called for an investment of Kr. 1,800,000 (£125,000), and is the most modern of its kind in Scandinavia.

Production is concentrated to three autumn months, when the plant is to be run continuously 24 hours a day, seven days a week. The factory employs a staff of 13, only eight of whom (two per shift) are occupied with the actual operation of the plant, while five day-shift workers handle operations at the receiving and dispatching ends of the factory. Some 200 potato growers supply the plant, which can receive 200 tons of potatoes a day, the storage depot of the three-storey building holding about 430 tons. The plant uses some 1,200 litres of water per minute. The highly automatised manufacturing process includes a so-called three-stage system for the extraction and purification of the flour, which has reduced manual operation to a minimum and offers possibilities of introducing wholly automatic control of the purification process.

Norwegian company increases frozen fish sales

The Norwegian company Frionor boosted its frozen fish sales by 35% in the year ending June 30, to reach a total of 26,000 tons in 28 countries.

Record West German grape crop

Last year's crop of grapes in West Germany, the biggest harvest since records were first kept 90 years ago, is expected to yield about 125 m. gallons of wine. It is not forecast that the 1960 vintage will equal the previous year's "wine of a century," owing to lack of sunshine, but it will rank above average. The quantity is so great that a storage problem has developed in some areas, which the Palatinate vintners have solved by storing the wine in monster plastic containers which are then submerged in water, the pressure of which prevents the contents bursting through the plastic.

Last year the Hungarian food industry spent about £10½ million on mechanisation. New machinery in the fruit preserving industry included automatic processing lines; this picture shows a processing plant at the Hatvani Conserve Factory.

New Pacific salmon trade for Norway?

Two varieties of Pacific salmon, Pink and Chum, are now invading the coast of northern Norway in great quantities, as a result of the continued large-scale setting out of spawn by the Russians round the Kola Peninsula. These varieties multiply rapidly, have a good flavour and are suitable for canning, and it is thought that they may become the foundation of a big new trade.

Rise in Tanganyika tea production

Production of made tea in Tanganyika for the year to the end of September, 1960, was 6,254,563 lb., an increase of 12% over the same period last year, reports Barclays Bank D.C.O.

India increases exports of vanaspati

Production of vanaspati (a solidified hydrogenated cooking-fat) has been steadily rising in recent years, and there are now 39 factories engaged in its production. During the period January to July, 1960, output was 209,700 tons, as compared with 193,200 tons during the corresponding period in 1959. Exports for the first four months of 1960-61 were estimated at £198,400.

Kenya meat factory to increase production

The Kenya Meat Commission announced recently that production at its Mombasa factory is to increase at the beginning of 1961 to a capacity of nearly 1,000,000 lb. of beef a month. The increase is mainly due to the Mombasa factory's supplying boneless beef for the Commission's large canning factory at Athi River, near Nairobi.

New sugar factory for Ghana

A sugar factory is to be set up at Komenda, Ghana, at a cost of £3 million, according to a statement by President Kwame Nkrumah.

Protective meat-wrapper developed in Australia

A protective wrapper for extending the shelf-life of moisture-containing meat has been developed in Australia. Made of cellulosic sheet material incorporating a water-soluble broad

A U.S. trade mission has recently been visiting East Africa and on October 28 toured the Manji biscuit factory in Nairobi (see FOOD MANUFACTURE, *July, 1960, p. 297) The photo shows (l. to r.) Mr. Frank M. Cruger (Indiana Manufacturers Supply Co.), Mr. Herbert J. Cummings (Mission Director and Director of Near East and African Division, Bureau of Commerce (Foreign) U.S.A.), Mr. M. Manji (managing director), and Mr. K. Manji (director).*

spectrum antibiotic and a softener adapted to diffuse readily on contact into the surface of meat, the wrapping-material contains antibiotic in an amount corresponding to 5 to 25 mg. per sq. metre of sheet surface.

World's most up-to-date coffee mills opened in Kenya

The new £800,000 coffee curing mills of the Kenya Planters' Co-operative Union, said to be the most up to date in the world, were opened in Nairobi recently. The new mills have been designed to deal with all types of coffee and contain equipment never before used in the coffee industry. Coffee is untouched by hand from the time it arrives at the mills until it is mechanically filled into sacks. The mills are able to process 7,000 tons of coffee a month.

Cheaper sweets in Norway

The most striking result in Norway of the E.F.T.A. agreement when it came into force recently was an indirect one: there was a reduction of about 25% in the price of chocolate and sweets. A bar of chocolate previously costing 1s. can now be munched for 9d. This is a result of a decision to reduce the special purchase tax on sweets from 90% to 60% in order to enable the industry to meet foreign competition.

Microbiology congress to meet at Montreal

The Eighth International Congress for Microbiology will be held at Montreal, Canada, from August 19 to 25, 1962, under the auspices of the Canadian Society of Microbiologists.

Enquiries should be made to Dr. N. E. Gibbons, National Research Council, Ottawa, 2.

Notes for Contributors and Authors

The Editor of FOOD MANUFACTURE welcomes articles, news items and other contributions on all aspects of food production.

The purpose of this journal is to exchange information between all those concerned in the food industry. Articles should therefore be written in a readable style, avoiding esoteric terminology and technical jargon, and should contain factual and practical information.

A preliminary synopsis should, preferably, be sent to the Editor, and the contribution itself should be typed in double spacing on one side of the paper only. It should bear the name and address of the author and should be accompanied by photographs suitable for illustrations.

OBITER DICTA

● I agree with Dr. Johnson that he who does not mind his belly will hardly mind anything else. —*Mr. Nubar Gulbenkian.*

● Hottest new prospect in the frozen-food industry today is the use of liquid nitrogen to provide refrigeration. — *Food Manufacture.*

● The thought of eating a meal first cooked in a gigantic commercial kitchen, wrapped in plastic, and then frozen, is awful.—*Farming Express.*

● Something very significant is happening to the British people; after a lapse of 250 years they are taking an interest in food again.—*Sunday Times.*

● Most engines of today are like fat, rich women dining in restaurants. They take 30% of the fuel set before them, and discard the rest.—*Daily Telegraph.*

● An Englishman will spend 27s. 6d. on a round of drinks but will have a fit if his wife puts cream—which makes all the difference—into the soup. — *Mr. Anthony Blond.*

● He used to contend that Coke would not only drown any insects, but because of the carbon dioxide in it, render them harmless, if not palatable.—*Financial Times.*

● If we catch up with the United States in *per capita* production of meat, butter and milk we will fire a powerful torpedo under the foundations of capitalism.—*Mr. Krushchev.*

● Vasco Lazzolo, the artist, is now doing a portrait of Ian Lyle, the sugar king. Mr. Lazzolo says (and we should forgive him for saying it): "It is the beginning of my cubist period."—*Daily Express.*

● We take so much for granted that food ought to be pure, that at first sight it seems odd that there should be any more cause for celebrations or centenaries of it than of other features of our social life, like the institution of marriage or the custom of eating apple with our roast pork.—*Mr. Christopher Soames.*

● With the advent of television, a new industry has developed which prepackages frozen ice-cream, whipped cream desserts and delicacies designed to tempt the viewer. While the viewer is in this oblivious state he munches continuously and contentedly. His only exercise night after night is to take five or ten vigorous steps to the door of the refrigerator. In short, we have become a nation of television athletes.—*Press release.*

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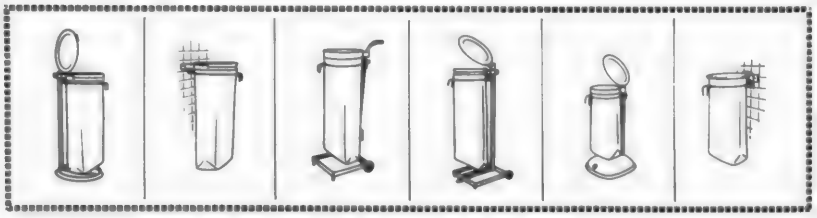

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Mr. J. E. Cooke

Mr. J. Bennett

Mr. A. Beresford

Mr. I. MacLeod

Mr. G. Pullar

Mr. P. S. Griffin

PEOPLE

A new company, Associated Fisheries and Foods (Holdings), Ltd., has been formed. Chairman is MR. JOHN BENNETT, and managing director is MR. W. M. MILNE. Three other chief executives have been appointed: MR. E. A. R. SYMS (general sales manager), MR. J. E. COOKE (general production manager) and MR. J. C. ATKIN (financial controller and secretary). The new company provides a single identity for the distribution organisation of Associated Fisheries.

*

Following the retirement of SIR SAMUEL R. BEALE, K.B.E., M.I.MECH.E., MR. P. B. H. BROWN, M.I.MECH.E., M.INST.R., has been appointed chairman of Worthington-Simpson, Ltd.

*

MR. D. HAWEELI, vice president of Campbell's Soups International, with offices in Geneva, has been appointed chairman of Campbell's Soups, Ltd. He succeeds MR. W. B. MURPHY, president of the parent company, Campbell Soup Company.

The managing director, MR. R. H. BEEBY, has also been appointed deputy chairman.

*

MR. TIMOTHY P. G. KITSON, M.P., been appointed Parliamentary Private Secretary to Mr. W. M. F. Vane, T.D., M.P., Joint Parliamentary Secretary to the Ministry of Agriculture, Fisheries and Food.

*

H. J. Heinz Co. announce that MR. J. E. HUTCHINSON has been appointed deputy managing director, with effect from September 19.

Mr. Hutchinson, who was formerly joint assistant managing director with responsibility for co-ordinating Manufacturing, Engineering, Research and Quality Control, and Purchasing, will now be directly responsible to Mr. F. G. Crabb, managing director, for the overall operations of Heinz. He joined Heinz as a salesman in the Hull Branch in 1929. He has been a director of the company since 1944.

MR. ANTHONY BERESFORD, director of manufacturing of H. J. Heinz Co., Ltd., has been elected to the Board of Governors of the National College of Food Technology.

Mr. Beresford joined Heinz in 1931 as a junior clerk at Harlesden; he was appointed to the Heinz board of directors in December, 1956.

*

MR. IAN MACLEOD, M.A.S.M.E., A.M.I.P.E., has been appointed technical director of the newly formed Lightnin Mixers, Ltd. He has been technical director of Stockdale Engineering, Ltd., for the last two years.

*

MR. P. T. STEPHENS has been appointed deputy chairman of the Saunders Valve Co., Ltd., while remaining joint managing director with MR. A. L. TRUMP. MR. P. C. E. ROSE has been appointed general manager of the company's Industrial Divisions.

*

MR. C. A. KENT has retired from T. Wall and Sons (Ice Cream) Ltd., following 35 years' service with the company. His most recent position was that of development adviser to the commercial director. He joined Wall's in 1925 and held a number of executive positions on the sales and distribution side of the business.

*

MR. MARK VARDY, who is to retire from Beecham Foods, Ltd., in March, 1961, has been seconded to the advisory staff of Ashridge College at the request of the Principal, Major-General Estcourt. He is succeeded as sales director of the company by MR. F. C. ROBERTS, formerly general sales manager.

*

MR. E. M. THOMAS has been appointed resident representative in Hull of the Machinery Division of George Cohen, Sons and Co., Ltd., members of the George Cohen 600 Group.

Coming from the division's head office in London, Mr. Thomas succeeds MR. H. WHYMAN, who has now been appointed manager of the division's Kingsbury branch.

MR. GEOFFREY PULLAR, Lancashire and England opening batsman, has recently joined the Tyne Brand sales force.

*

MR. PETER S. GRIFFIN has been appointed sales manager of Fropax, Ltd. He has formerly been with Unilever, Thomas Hedley, Ltd., the Beecham Group and Joseph Tetley, Ltd. During the war he was assistant director to Lord Beaverbrook and later practised as a marketing consultant.

*

COMMANDER A. T. BOND, R.N. (Rtd.), has been appointed director of sales for P. Leiner and Sons (Wales), Ltd. He joined the company 12 years ago as assistant to the general manager at the Treforest factory, Glamorgan.

*

DR. ROLAND S. HANNAN has joined T. Wall and Sons (Meat and Handy Foods), Ltd., as chief chemist, and will take charge of new laboratories which are being built in Atlas Road, Willesden. He was formerly with the Low Temperature Research Station, Cambridge, and the Metal Box Co.

*

Obituary

The death has occurred of MR. ALFRED HENRY MOORE, chief chemist of the Pepsi-Cola Co. in Britain. He was 33, and was on a visit to Detroit at the time. He had been with the company for 12 years.

*

The death occurred on October 19 of SIR HARRY HAGUE, managing director of A. Wander, Ltd. He was 79. He had been vice-president of the Food Manufacturers' Federation Inc. since 1959, a member of the Council since 1940, and of the executive committee since 1947.

*

MR. SIDNEY ROBERT MANSFIELD, until recently chairman and managing director of International Flavors and Fragrances I.F.F. (Great Britain), Ltd., died on November 23. He was 65. He joined the company on its formation in 1926 and became a director in 1938.

Recent Patents

COMPLETE SPECIFICATIONS ACCEPTED

855,416. C. J. PATTERSON CO.: Baking processes.
855,029. A. DENHOLM: Ovens heated by hot air.
855,036. R. M. JOUBERT: Hoppers, bins and like containers mounted on skips, trucks and the like.
855,866. R. W. BARRACLOUGH, LTD., and R. W. BARRACLOUGH: Apparatus for handling wafers and biscuits.
855,731. CORN PRODUCTS CO.: Preparation of starch phosphate esters.
855,884. ADEQUATE WEIGHERS, LTD.: Intermittent weighing and weight indicating apparatus.
855,044. NEW MERTON BOARD MILLS, LTD.: Drums suitable for holding liquids.
855,838. JOY MANUFACTURING CO.: Flexible idler for an endless belt conveyer.
855,558. RADIO HEATERS, LTD.: Heating of foodstuffs.
855,747. PAKO CORPORATION: Endless belt conveyer apparatus.
855,897. FOOD MACHINERY AND CHEMICAL CORPORATION: Carton feeding and erecting mechanism.
855,605. ELFA - APPARATE - VERTRIEBS-G.M.B.H.: Process and apparatus for the cleansing of sugar beet.
855,700. A. PREISS: Lining for packing containers, such as boxes, cartons and the like.
855,892. GENERAL FOODS CORPORATION: Flavouring composition.
855,612. E. T. OAKES CORPORATION: Continuous mixers for dough and other plastic substances.
856,461. A.P.V. CO., LTD.: Treatment of liquids.
856,419. GESELLSCHAFT FÜR FERTIGUNGS-TECHNIK UND MASCHINENBAU G.M.B.H.: Milling machines.
855,931. APCO. INC.: Continuous beverage maker.
856,378. T. AND T. VICARS, LTD., J. EATON and R. B. CLEMENTS: Handling of biscuits or the like laminar articles.
855,947. A. SERAGNOLI and E. SERAGNOLI (trading as G.D. SOC. IN ACCOMANDITA SEMPLICE). Devices for feeding confectionery to wrapping machines and the like.
856,066. INSINOORITOIMISTO—ENGINEERING BUREAU R.T. HUKKI: Grinding mills.
856,484. LEHMANN G.M.B.H. MASCHINENFABRIK, F.B.: Apparatus for shelling cacao beans.
856,297. H. RUTTER: Method and apparatus for manufacturing packed chocolate confectionery articles.
856,078. ROWNTREE AND CO., LTD.: Table jellies.
856,183. KLÖCKNER - HUMBOLDT - DEUTZ A.G.: Centrifuge for dewatering fine-grained material.
856,814. A. SERAGNOLI and E. SERAGNOLI (trading as Soc. G.D. IN ACCOMANDITA SEMPLICE). Mechanisms for delivering articles into a machine particularly adapted for delivering caramels into wrapping machines.
856,819. EVANS RESEARCH AND DEVELOPMENT CORPORATION: Natural flavour of processed food.
856,781. ROSE BROS. (GAINSBOROUGH), LTD.: Wrapping machines.
856,568. P. CROMBIE: Machines for processing tea leaf.
856,842. D. W. BINGHAM AND CO. PROPRIETARY, LTD.: Pineapple peeling and coring machines.
856,894. SKYLUX, LTD.: Apparatus for husking and winnowing nuts.
856,763. CITY BAKERIES, LTD., and W. H. ATKINSON: Apparatus for coating articles of confectionery with material in granulated or powdered form.
856,718. BAKER PERKINS, LTD.: Apparatus for moulding sugar and like plastic materials.
856,905. HESSER, MASCHINENFABRIK A.G.: Wrapping machine.
856,705. GENERAL FOOD CO.: Production of ready-to-eat puffed cereal products.
856,963. W. G. R. SLEEMAN: Cutter for quartering oranges, grapefruit, apples and the like.

New patents are from the Journal of Patents. Permission to publish has been given by the Controller of Her Majesty's Stationery Office. The publication is obtainable from the Patents Office, 25, Southampton Buildings, London, W.C.2.

New Companies

Bentleys Frozen Foods, Ltd. (672223.) To take over bus. of frozen foods proprs. and distributors cd. on at Ashfield Road, and Curzon Street, Lancashire, by A. Bentley and Sons (Burnley), Ltd. £500. Dirs.: Cyril S. Bentley and James C. Bentley.

Amot Controls, Ltd. (672288.) 4, Romeland Street, St. Albans. To carry on bus. of mnfrs. of and dlrs. in thermostatic and vibrating controls and valves, heat exchangers, etc. £20,000. Dirs.: Thomas H. Cleghorn, Harry B. Worrall, Elton B. Fox, Thorold Gartrell and Earl Bornfield.

T. Wall and Son (Confectioners), Ltd. (672347.) 6, Gate Street, Lincoln's Inn Fields, London, W.C.2. £1,000. Dirs.: Thomas F. Wall and Mary C. Wall.

P. Samuelson and Co., Ltd. (672476.) 1, Crutched Friars, London, E.C.3. To take over the bus. of P. Samuelson and Co., and to carry on the bus. of dlrs. in essential oils, chemical preservatives and citrus products, etc. £5,000. Subs.: Alexander H. Samuelson, Stanley Waite and George W. Walker.

Gayros, Ltd. (672,634.) 61, Portland Place, London, W.1. To carry on bus. of retailers, wholesalers, mnfrs. of and dlrs. in food, etc. £100. Dirs.: Harvey Rosenberg and Sheila W. Rosenberg.

Toft Green Egg Packers, Ltd. (672783.) £5,000. Subs.: D. W. Dare and J. B. A. Willis, 18, Austin Friars, London, E.C.2.

Ebor Meat Co., Ltd. (672797.) £1,000. Subs.: Charles S. Blackburn, 17, Molescroft Road, Beverley, E. Yorks., and Gordon R. Scrowston.

Dry Freeze, Ltd. (672848.) Lion House, 72, Red Lion Street, London, W.C.1. To carry on bus. of mnfrs. of and dlrs. in dehydrated products; bakers, chocolate mnfrs., caterers, etc. £100. Dirs.: Edward Hack, T. W. J. Warder and J. Bell.

Dainty Dinah, Ltd. (672911.) 10, Cook Street, London, W.1. To carry on bus. of mnfrs. of and dlrs. in confectionery, sweetmeats, sugar refiners, mchts. and importers, etc. £100. Subs.: John E. Cama and Sidney J. Cousins.

Westler Foods, Ltd. (673274.) 15, Tooks Court, Cursitor Street, London, E.C.4. To carry on bus. of genl. provision mchts., etc. £20,000. Dirs.: Alexander M. Burdon-Cooper, Donald M Watson and Lt.-Col. Charles F. O. Breese.

Canascan, Ltd. (673359.) To carry on bus. of mnfrs. of and dlrs. in food, drinks, etc. £100. Subs.: Jean Herbert and Thos. A. Herbert.

Stanley Hanson, Ltd. (673551.) To take over the bus. of bakers, confectioners and pastrycooks carried on by Stanley E. and Edmund A. Hanson at Skegness as "S. E. Hanson," etc. £12,000. Ch. and mang. dir.: Stanley E. Hanson.

Geo. T. Stone and Son, Ltd. (673638.) 1-2, Churton Street, Vauxhall Bridge Road, London, S.W.1. To carry on bus. of butchers and sausage mnfrs., etc. £100. Dirs.: Geo. T. Stone and Mrs. E. R. Stone.

Akanthou Trading (London), Ltd. (673685.) 421, Green Lanes, London, N.4. To carry on bus. of packers, canners, bottlers, importers and exporters of and dlrs. in fruit, vegetables, etc. £5,000. Dirs.: Sotos G. Kaffa, George Hajipieri, Vassos Aristidou and Photis Papaphotis.

Genevieve (Frozen Meals), Ltd. (673859.) 16, Wimpole Street, London, W.1. £3,000. Dir.: Joseph K. Berkmann.

Tyne Icecream Company, Ltd. (673914.) £100. Dirs.: Dominico Facchino and Edwin Thirlwell.

C. and S. Hardcastle, Ltd. (674107.) 23, Welbeck Street, London, W.1. To carry on bus. of brewers, distillers and mnfrs. of and dlrs. in beer, ale, porter, stout, wines and spirits, etc. £100. Dirs.: Chas. S. Hardcastle and Sheila M. Hardcastle.

Gordon's (News), Ltd. (674115.) 533, Wandsworth Road, London, S.W.18. To carry on bus. of dlrs. in and mnfrs. of confectionery, chocolates and sweets; newsagents, booksellers, etc. £100. Dirs.: Mrs. Margaret M. Rodger and Peter G. Rodger.

Cottage Dairies, Ltd. (674202.) 97, Belgrave Road, Wanstead, London, E.11. £100. Dirs.: John F. Penny and Pamela Penny.

W. and M. A. Oliver, Ltd. (674281.) 408, York Road, Leeds, 9. To carry on bus. of bakers, etc. £1,000. Dirs.: William Oliver and Maud A. Oliver.

Boundary Cooked Meats Co., Ltd. (674304.) 55-57, Priory Road, Liverpool, 4. £5,000. Dirs.: Arthur S. Nall, Francis H. Ferguson and Alfred H. Wickstead.

Rees and Bosse (Meat Manufacturers), Ltd. (674378.) 226, New Road, Skewen, Glam. To carry on bus. of mnfrs. of and dlrs. in sausages, etc. £3,000. Dirs.: Gwilym Rees, Jocelyn M. Bosse, Hannah P. Rees and Harald Bosse.

These particulars of new companies recently registered have been extracted from the daily register of Jordan and Sons, Ltd., Company Registration Agents, 116, Chancery Lane, London, W.C.2.

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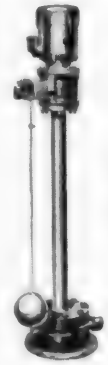

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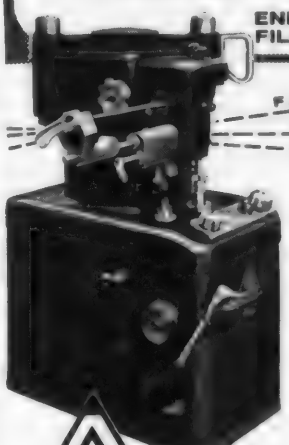

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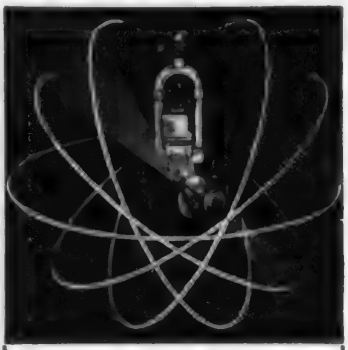

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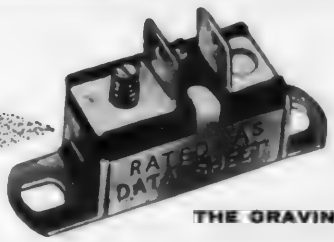

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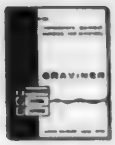

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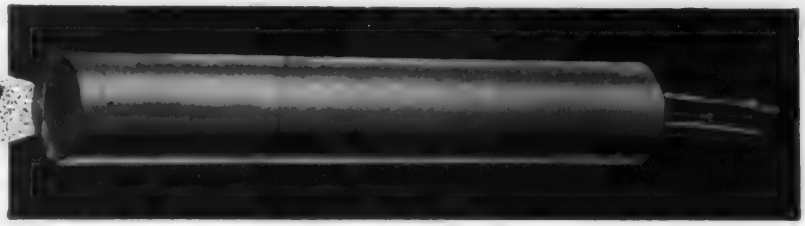

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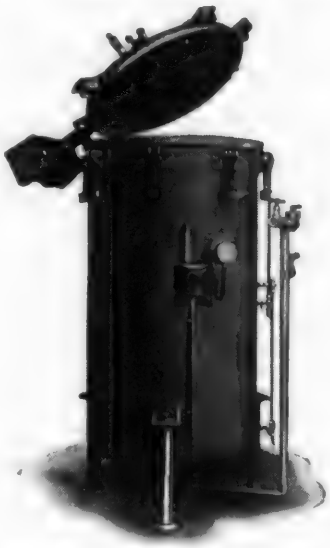

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Ref. A.725. British. Male. Married. Age 34. H.N.C. (Elec. Engg.) and endorsement Applied Mechanics. 2 years Apprentice, switchgear and transformer manufacturers. 4 years Sgt. Electrician, army. 3½ years Draughtsman, switchgear and transformer manufacturers. 3 years Draughtsman, transformer manufacturers. 3 years Draughtsman, precipitator manufacturers. At present Electrical Engineer, electrical and mechanical engineers. Seeks post as **ELECTRICAL ENGINEER.** London or Kent. £1,200 p.a.

Ref. A.726. Indian. **RESIDENT U.K.** H.N.C. Electrical and 4 endorsements, studying for Grad. I.E.E. 6 months Chargehand, fluorescent light fittings. 6 months Tester and Inspector, switchgear manufacturers. 4 years Assistant Engineer, traction engineers. At present Development Engineer, instrument manufacturers. Good knowledge of precision electro mechanical design and of semi-conductor theory and practice. Seeks post as **ELECTRICAL ENGINEER (DEVELOPMENT OR TEST FORMULATION).** U.K. £900 p.a. approx.

Ref. A.727. British. Male. Single. Age 28. H.N.C. (Mech.). Stud.I.C.E. 5 years Apprentice and 3 years Junior Engineer, statutory water undertaking. 1 year Design Draughtsman, industrial consultants. 1 year Design Draughtsman, oil company. At present Civil Engineering Technical Assistant, civil engineering consultants. Experience as Site Engineer, supervising contract work (large water pipelines and ancillary works) and drawing office supervision connected with pure hydraulics (water supply, oil distribution). Seeks appointment as **ENGINEER.** London, Surrey or South Middlesex. £1,000 p.a. min.

Ref. A.729. British. Male. Married. Age 43. 5 years Workshop Fitter, 7 years Draughtsman, 4 years Project Draughtsman, 2 years Chief Draughtsman, 2 years Chief Designer and 1 year Planning Engineer and Sales Engineer, all with conveyor and elevator manufacturers. At present Planning and Projects Engineer, mechanical handling and belt conveyor manufacturers. Inventor of rotary floor 50-ton storage silo and of new type conveyor belt. Fluent Portuguese, good French and Spanish. Seeks appointment as **PLANNING AND TECHNICAL SALES ENGINEER.** London area preferred. £1,500/1,800 p.a.

Ref. A.731. British. Male. Married. Age 27. O.N.C. and H.N.C. Mech., G.I.Mech.E. 4½ years Apprentice and 2 years Draughtsman, general engineers and founders. 3 years Stressman, aircraft manufacturer. 2 years Design Draughtsman, guided weapons. Seeks post as **ENGINEER (MECHANICAL).** U.K. £1,000 p.a.

Ref. A.732. British. Male. Married. Age 28. O.N.C. Mech. 5 years Design Draughtsman Apprenticeship (2 years drawing office and 3 years machine shop). 2 years Assistant Apprentice Supervisor, responsible for training apprentices in workshop practice and technology, electrical engineers. At present Senior Production Engineer, electro-mechanical and electronic engineering, responsible for stock and production control, production planning, estimating, process control and sales engineering. Seeks **SALES ENGINEERING** post. S.E. England. £1,200/£1,500 p.a.

Ref. A.735. British. Male. Married. Age 36. R.N. Certs. for steam and diesel, M.Assoc. Supervisory Electrical Engineers. 5 years Apprentice Engineer, wire works. 7 years Engine Room Artificer, R.N. 6 years Deputy Maintenance Manager and 5 years Maintenance Manager, international textile company, responsible for maintenance and services of all the company's property, all alterations and new equipment, staff selection and purchasing, of all maintenance materials, and complete control of all contractors, fire insurance and security. Seeks **SIMILAR POST OR AS WORKS MANAGER,** small engineering works. U.K., preferably S. England. £1,500 p.a. approx.

Ref. A.736. British. Male. Married. Age 29. Full Technological Cert. 6 years Apprentice Machine Tool Fitter Toolmaker, screw machine manufacturers. 2 years Toolmaker, special purpose machines. 1½ years Development Shop, fitting and drawing details, special purpose electrical machines. At present Electro-Mechanical Draughtsman, electronics engineers. Seeks post as **ELECTRONIC OR ELECTRO-MECHANICAL DRAUGHTSMAN.** London or Essex. £950 p.a.

Ref. A.737. British. Male. Married. Age 45. O.N.C. Mech., 1st Class M.O.T. Cert. Steam and Motor, M.I.Mar.E. 2½ years Fitter, armaments manufacturer. 3 months Toolmaker, instrument makers. 7½ years Engineer Officer, ship owners. 1 year Engineer i/c site, air conditioning. 3½ years Plant Engineer and 2 years Chief Engineer, meat packers. 7 years Test Engineer, land and marine boiler makers. At present Chief Commissioning Engineer, design, manufacturer and installation of oil fuel burning equipment. Seeks **SENIOR MANAGEMENT** post. London or within reach of Worthing. £1,750 p.a.

Ref. A.739. British. Male. Married. Age 45. Northern Counties 4th year Mech. Eng. and 5th year Elec. Engr. 5 years Apprentice, electrical engineers. 9 years Inspector/Production Engineer, electrical engineers. 7 years Chief Planning and Rate Fixing E. Engineer, electrical engineers. 5 years Chief Estimator, general engineers. 6 months Works Manager, mechanical handling engineers. 2 years Methods Engineer, general engineers. At present Methods Engineer, fabricating and light railway engineers. Seeks **PRODUCTION ENGINEERING** appointment. U.K. £1,500 p.a. min.

Ref. A.741. British. Male. Married. Age 33. O.N.C. Elec. 5 years Student, light electrical engineering. 2 years Laboratory Assistant, 3 years Tester and 6 years Design Draughtsman, light electrical engineers. At present Design Draughtsman (Electro-Mechanical), light electrical engineering—radio, radar. Seeks post as **DESIGN DRAUGHTSMAN.** Essex or London. Salary £1,000 p.a. approx.

Ref. A.742. Indian. Male. Single. Age 24. **RESIDENT U.K.** Grad. in Mech. Engg. 3½ years Mechanical Engineer, production of glass bottles and mosaic tiles i/c machine shop production, maintenance of furnace, erection of machines, tank furnaces, laying out of air and oil lines. Seeks **MECHANICAL ENGINEERING** post. U.K. Canada or U.S.A.

Ref. A.743. Iraqui. Age 24. Single. **RESIDENT U.K.** G.C.E. "A" Level Chem., Physics, Pure and Applied Math. Seeks post as **TECHNICAL OR LABORATORY ASSISTANT OR RESEARCH ASSISTANT.** London. £500 £600 p.a.

Ref. A.744. British. Male. Married. Age 32. O.N.C. and H.N.C. Elec. Engg. with endorsement in Applied Mech., Heating Engg., Physics, Grad. M.I.E.E. 5 years Apprentice and 5 years Development Engineer, glass manufacturers. 2 years Electrical Engineer to Borough Engineer, and 11 years Senior Electrical Engineer, City Architect, Local Government. 2 years Electrical Engineering, industrial electrical engineering section, cable manufacturers. 2 years Electrical Engineering Consultant, Local Government. Experience in technical college lecturing and interested in automatic control, factory electrics and electronics, maintenance and preventive and planning maintenance. Seeks post as **ELECTRICAL ENGINEER (DESIGN, INSTALLATION AND MAINTENANCE).** Anywhere. U.K. Salary £1,600 p.a.

Ref. A.745. British. Male. Married. Age 44. Matric. (Maths./Physics Honours), A.Inst.R. 5 years Electrical and General Engineering Apprenticeship. 2 years private tuition in draughtsmanship. 4½ years R.E.M.E. Officer i/c static radar. 8 years General Manager, Refrigerator Division, electrical engineering contractors. 2 years Assistant Branch Manager, Refrigeration and Air Conditioning Division, electrical engineering. 6 months General Sales Manager, boilers. At present engaged in Sales Promotion. Seeks **EXECUTIVE TECHNICAL SALES** appointment. England. £1,500 p.a. min.

[Continued overleaf

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Signature____ Date____

I.S.I.S. APPOINTMENTS REGISTER *(Continued from overleaf)*

Ref. A.746. British. Male. Married. Age 34. O.N.C. Mech. Eng., 2nd Class M.O.T. Motor Cert., Part A. 1st Class M.O.T. Cert., A.I.Mar.E. 6 years Apprentice Engineer, marine engine builders. 6 years Engineer Officer Senior 2nd Engineer Officer, Merchant Navy. 1 year Work Study Engineer, glassware manufacturers. 6 months Diesel Experimental Test Engineer, diesel engine manufacturers. 6 months Process Planner and Rate Fixer, aero engine makers. 10 months Shift Foreman, cathode ray tube makers. 3 years Technical Assistant (production and maintenance)—petroleum distributors. 9 months Technical Representative, petroleum distributors—industrial and marine lubricants. Seeks post as **PRODUCTION MAINTENANCE POWER PLANT TECHNICAL SERVICE OR SALES ENGINEER.** U.K., Tyne, Wear or Tees area preferred. £950 p.a. minimum.

Ref. A.747. British. Male. Married. Age 26. B.Sc. (Eng.)—theory of machines, fluids and heat engines. 2½ years Apprentice, manufacturer of electrical goods. 3½ years Designer, aero engines. Seeks post as **DESIGN ENGINEER.** U.K. preferably S. England. £1,000 p.a. minimum.

Ref. A.748. British. Male. Single. Age 28. Nat. Cert. Level Maths, Chem., Physics and Metallurgy. Studying for Lic. of Inst. of Metallurgists. 2 years Metallurgical Assistant, light engineering. 10 months Research Assistant, research association (corrosion). 5½ years Metallurgist i/c metallurgy department, light engineering. Experience in all metallurgical control applied to light industries and capable of starting or expanding technical department M.Inst. of Metals. Will consider any **TECHNICAL ENGINEERING OR TECHNICAL REPRESENTATION POST.** Preferably London or Western Home Counties. £950 p.a.

Ref. A.749. British. Male. Married. Age 39. Full Engineering Apprenticeship and then worked on steam and water turbine installations, U.K. and abroad, including 6 years as Superintendent on two comprehensive developments. At present Commissioning, Service and Liaison Engineer, heavy electrical engineering. Seeks appointment as **PLANT INSTALLATION SUPERINTENDENT OR MANAGER.** U.K. or anywhere abroad, but if abroad Far East or S. America preferred. £2,000 p.a.

Ref. A.750. British. Male. Single. Age 26. O.N.C. Mech. 5 years Apprentice, motor vehicle manufacturers. National Service engaged on major overhaul of aircraft instruments. 1½ years Assistant Engineer, missile engineers. Interested in **POST IN MOTOR (COMM.), INSTRUMENTATION OR AIRCRAFT MAINTENANCE.** U.K., not London or Home Counties. £800 p.a.

Ref. A.751. British. Male. Age 45. 5 years Student Engineer, engineering college diploma. M.Inst. sanitary, heating and ventilation engineers and certificates. 3 years Student Engineer, office and site training, civil engineers contract. 3 years Engineering Assistant, public works contractors. 4 years Civil Engineer and Building Surveyor, private practice. 2 years Maintenance Engineer, electric engineers. 1 year Engineer's Surveyor, Borough Engineer's office. 2½ years Consulting and Inspecting Civil Engineer, Air Ministry. 1½ years District Engineer, waterways. 2 years Project and Resident Engineer, consulting engineers, dealing with all design offices, architectural, structural, civil, mechanical, electrical liaison with client and representatives at head office and site programming and scheduling work to be carried out by contractor, preparing contracts and contract documents: general and overall supervision from office and site of major contracts. Seeks appointment as **CIVIL CONSTRUCTIONAL CONSULTING ENGINEER.** London area.

Ref. A.752. Israeli. Married. Age 31. Now resident U.K. B.Sc. 2 years Mechanic, aircraft maintenance. 1½ years Industrial Engineer, heavy chemicals. 1 year Industrial and Production Engineer, metal working and plywood factory. Seeks post as **INDUSTRIAL OR SALES ENGINEER**, or would consider other offers. London, U.S.A. or Far East. £1,000 p.a. approximately.

Ref. A.753. British. Male. Married. Age 29. H.N.C. (Prod.). 4 years Apprentice, instrument makers. 1 year Production Machinist, aircraft electrical engineers. 1 year Toolmaker, heating engineer. 1 year Work Study Engineer/Planning Engineer/ Tool Draughtsman, engineering consultants. 5 years Tool Draughtsman/Planning Engineer/ Methods Engineer, diesel and electrical engineers. At present Assistant Chief Production Engineer, engineering consultants. Seeks post as **PRODUCTION ENGINEER.** London area (within 25-mile radius) or S.E. England (with housing), £1,500 p.a.

Ref. A.754. British. Male. Single. O.N.C. Mech. and Jig and Tool endorsement. 5½ years Apprentice, aircraft manufacturers. 4½ years Design Draughtsman, hydraulics and pneumatics, aircraft test beds. At present Senior Design Draughtsman, manufacturer for printing industry. Seeks post as **DESIGN DRAUGHTSMAN.** London or abroad. £1,100 p.a.

Ref. A.755. Indian. Male. Married. Age 46. **RESIDENT U.K.** B.Sc. Tech. (Elec. Engg.) (Manchester Univ.) and M.Sc. (Manchester). 1 year Electrical and Mechanical Engineer, cement manufacturer. 2 years Sales Engineer, American electrical manufacturers. 11 years Manager in India of agents for U.K. machinery company. 6 years Sales Manager Manager/Works Manager, Indian agents for U.K. machinery and manufacturers of drums. 1½ years Works Manager, manufacturer of cans, drums and pilfer-proof and roll-on seals (British-owned factory). Seeks appointment in U.K.—preferably London area—as **SENIOR EXECUTIVE (COMMERCE INDUSTRY).** £1,500 £1,750 p.a. approximately.

Ref. A.756. British. Male. Single. Age 23. H.N.C. Mech. 5 years Apprentice and 1½ years Design Draughtsman, commercial vehicle manufacturer. At present Design Draughtsman, special purpose machine design. Seeks post as **RESEARCH DESIGN DEVELOPMENT ENGINEER (OR AS TRAINEE ENGINEER).** Aldershot district. £780 p.a.

Ref. A.757. Indian. Male. Single Age 24. **RESIDENT U.K.** Grad.I.C.E., B.Sc. Eng. (London). 1 year Trainee Engineer, architects and engineers. 1 year Graduate Engineer, consulting engineers. At present Structural Design, petroleum refinery designers. Seeks post as **DESIGN ENGINEER** (Civil). London. £1,000 p.a. approximately.

Ref. A.758. British. Male. Single. Age 26. H.N.C. (Mech.), endorsements: Metallurgy, Elec., Engg., C. & G. Inter. Workshop Practice. 5 years Apprentice and 2 years Estimating and Planning Engineer, bearings. 1 year Estimating and Methods Engineer, Aircraft products. 1 year Works Engineer, central heating and gas fires. At present Estimator and Production Engineer, electronic and sub-contract. Seeks post as **ASSISTANT WORKS MANAGER OR PRODUCTION ENGINEER.** London or Surrey. £1,000 p.a.

Ref. A.759. British. Male. Married. Age 35. C. & G. Metrology, A.M.I.E.I. 6½ years Apprentice Improver, instrument makers. 3 years Floor Inspector, sewing machine company. 7 years Senior Mechanical Inspector, radar manufacturers. 1 year Assistant Chief Inspector, general engineers. At present Chief Inspector/ Quality Control Advisor, electronics, valves. Has studied quality control as applied to the engineering industry since its inception. Seeks post as **CHIEF INSPECTOR QUALITY CONTROL MANAGER.** London or suburbs. £1,250 £1,500 p.a.

Ref. A.760. British. Male. Married. Age 32. H.N.C. Mech. with endorsements in Elec., Mech. of Fluids, Workshop Technology, Factory Organisation and Layout, Industrial Management. Army experience includes Technical Administration R.E.M.E. HQ., Vehicle, Tank and Plant Examiner, i/c Vehicle Workshop, Production Line Foreman for War Office programme. 18 months Artificers' Course specialising in vehicles, tanks, fire control equipment and hydraulic controls. At present Production Planner, R.E.M.E. Workshop. Seeks **TECHNICAL REPRESENTATION OR WORKS ENGINEERING POST.** Anywhere south of line between London and Liverpool. £1,250 p.a.

Ref. A.761. Irish. Male. Married. Age 41. Cert. of Technical College. Member Amer. Soc. Refrig. and Air-Conditioning Engineer, Brit. Inst. R. 7 years Trainee Sales Engineer Field Rep. 1 year Sales Manager, cooling equipment. 1 year Service Manager, refrigeration concern. 1 year Sales Manager, engineers. 5 years General Manager, Irish refrigeration company. 4 years Chief Refrigeration Engineer, Ghana (fully experienced cold storage operation and refrigerated transport). Now returned to Ireland and seeks **MANAGEMENT POST IN REFRIGERATION AIR CONDITIONING.** West Africa (preferably Ghana), Nigeria, Middle East.

Ref. A.762. British. Male. Married. Age 50. C. & G. Eng., A.M.I.(Plant)E. 7 years Apprentice Fitter/Turner—machine shop, general engineers. 12 years Works Engineer, public works contractors. 7 years Plant Engineer, civil engineers. 2 years Engineer Inspector, engineers. 2 years Mechanical Engineer and 3½ years Depot Engineer Manager, civil engineers. Seeks **ENGINEERING APPOINTMENT.** U.K. £850 £1,000 p.a.

Ref. A.763. Pakistani. Male. Single. Age 27. **RESIDENT U.K.** B.E. (Elect. & Mech.). 4 years Junior Executive in engineering section of airline, dealing with design alterations, modifications, preparation of overhaul/maintenance procedures, preparation of drawings of aircraft electrical components and systems. Seeks post as **DRAUGHTSMAN [ELECTRICAL] OR ENGINEER.** London.

Ref. A.764. British. Male. Married. Age 43. 14 months Toolmaker Jig Borer, insulators and press tools. 3 years Toolmaker, manufacturer of press tools. 8 years Apprentice/Toolmaker, manufacturer press tools and metal marking stamps. Military service 1½ years Signal Instructor and 6 months Trade Instructor. At present Toolroom Chargehand/Jig Borer, mica insulators and press tools. Seeks post as Tool Room **FOREMAN CHARGEHAND OR TRAINING OFFICER.** Preferably E. or N.E. London, Kent or Surrey. £23 per week.

Ref. A.765. British. Male. Married. Age 37. Technical education to Nat. Cert. standard. 1½ years Engineer, telecommunications. 5 years Radio and Television Engineer, retail radio and TV. 5 years self-employed radio and TV engineer. 1½ years Technical Sales Correspondent, precision instrument manufacturers. Seeks post as **ELECTRONIC INSTRUMENTATION ENGINEER.** London, preferably N. London. £1,000 p.a. approximately.

Ref. A.766. British. Male. Married. Age 39. M.B.E., A.M.I.Mech.E. Course in Mechanical Marine and Electrical Engineering at Royal Naval Engineering College. Now retired from R.N. where service career as Engineer Officer (Marine, Submarine and Ordnance) included: Engineer i/c Submarine propelling and auxiliary trials officer, squadron ordnance engineer officer for submarines, service in civil-manned experimental establishments, superintendent of armament depot. Seeks **MECHANICAL ENGINEERING APPOINTMENT (MANAGEMENT, TESTING, REPRESENTING, MAINTENANCE).** U.K., but not Scotland, S. Wales or N. England industrial area. £1,400 p.a. minimum.

Ref. A.768. British. Male. Single. Age 23. H.N.C. Mech. Engg. with endorsements to qualify for Grad.I.Mech.E. 4 years Trainee, automobiles. 1 year Draughtsman, light engineering. Completing National Service November, 1960, when requiring post as **MECHANICAL ENGINEER**, preferably South America.

Ref. A.769. British. Male. Married. Age 39. B.Sc. (Eng.), A.M.I.Mech.E. 1 year Student Apprenticeship, aircraft manufacturers, course in Work Study. Fluent French and some German. 7 years Manager—Project Department, combustion engineers. 4 years Technical Sales Manager, industrial and medical instrument makers. 2 years General Sales Manager, instrument makers and precision engineers. At present Survey Director, management consultants. Seeks appointment as **GENERAL MANAGER OR GENERAL SALES MANAGER.** London or Home Counties. £3,500 p.a.

Ref. A.771. British. Male. Age 37. B.Sc. 9 months Research Assistant, pharmaceuticals. 3 years Laboratory Assistant, S. African medical school. 1½ years Medical Representative, S. African representatives of U.K. pharmaceutical concern. At present employed U.K. by manufacturing chemist. Seeks post as **MEDICAL REPRESENTATIVE IN CENTRAL AFRICAN FEDERATION, RHODESIA AND NYASALAND.** £1,500 £2,000 p.a.

Ref. A.772. Indian. Male. Married. Age 25. **RESIDENT U.K.** Diploma in Elect. Engg. 1½ years Apprentice in Electrical Department, production of acids, caustic soda, super phosphate, alums and other chemicals. 4 months Mains Inspector, generation and distribution of electricity. At present Wireman, design and manufacturer of electronic appliances. Considerable experience erection, maintenance and repair of motors, starters, switchgears, transformers and rectifiers and L.T. and H.T. cable jointing. Seeks post as **ELECTRICIAN WIREMAN.** London or Manchester. £14 per week minimum.

Ref. A.773. British. Male. Married. Age 36. 3 years Air Mechanic, Fleet Air Arm. 3 years Tool Setter, water, steam valves. At present Machine Shop Foreman and Deputy Superintendent, wrist watch manufacturers. Seeks post as **MACHINE SHOP SUPERINTENDENT.** Anywhere. £1,200 p.a.

Ref. A.774. British. Male. Married. Age 40. Inter. B.Sc. Chem. with Physics subsid. Trained in work study/cost control. 12 years Assistant Works Manager, soaps, detergents and edible fats. 1 year Works Manager, chipboard manufacturer. At present General Manager, manufacturer soaps and associated products. Seeks post as **GENERAL MANAGER OR GENERAL WORKS MANAGER.** U.K. £2,250 p.a.

Ref. A.775. British. Male. Married. Age 31. War Office Engineering Course in Telecommunications and Technical College Diploma Course in Civil and Structural Engineering. 2 years Resident Engineer, on new construction and design, oil company. 6 months Technical Advisory Service, sheet steel suppliers. 9 months Section Engineer, on power station construction, civil engineering contractors. 9 months Designer on railways reconstruction, civil engineering consultants. 9 months Technical Sales Design and Estimating, new building construction, system suppliers. 4 months Design and Site Investigation, civil engineering consultants. At present Civil Engineering Designer, consulting engineers (foundation works). Seeks **CIVIL ENGINEERING / ADMINISTRATIVE / SALES OR DEVELOPMENT APPOINTMENT.** London Dorking area. £1,400 p.a.

Ref. A.777. British. Male. Married. Age 42. 4 years Trainee Service Engineer, radio manufacturers. 6 years Technical Officer, radar—R.A.F. 6 years Test Equipment/Technical Sales Engineer, electronic component manufacturers. At present Technical Sales and Service Manager—telecommunications, domestic appliances, refrigeration, West African traders. Has now returned to U.K. and seeks **TECHNICAL SALES OR SERVICE APPOINTMENT.** W. Africa, Malaya or U.K. £1,500 p.a.

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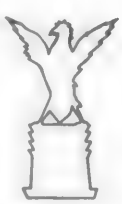

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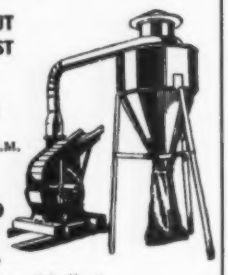

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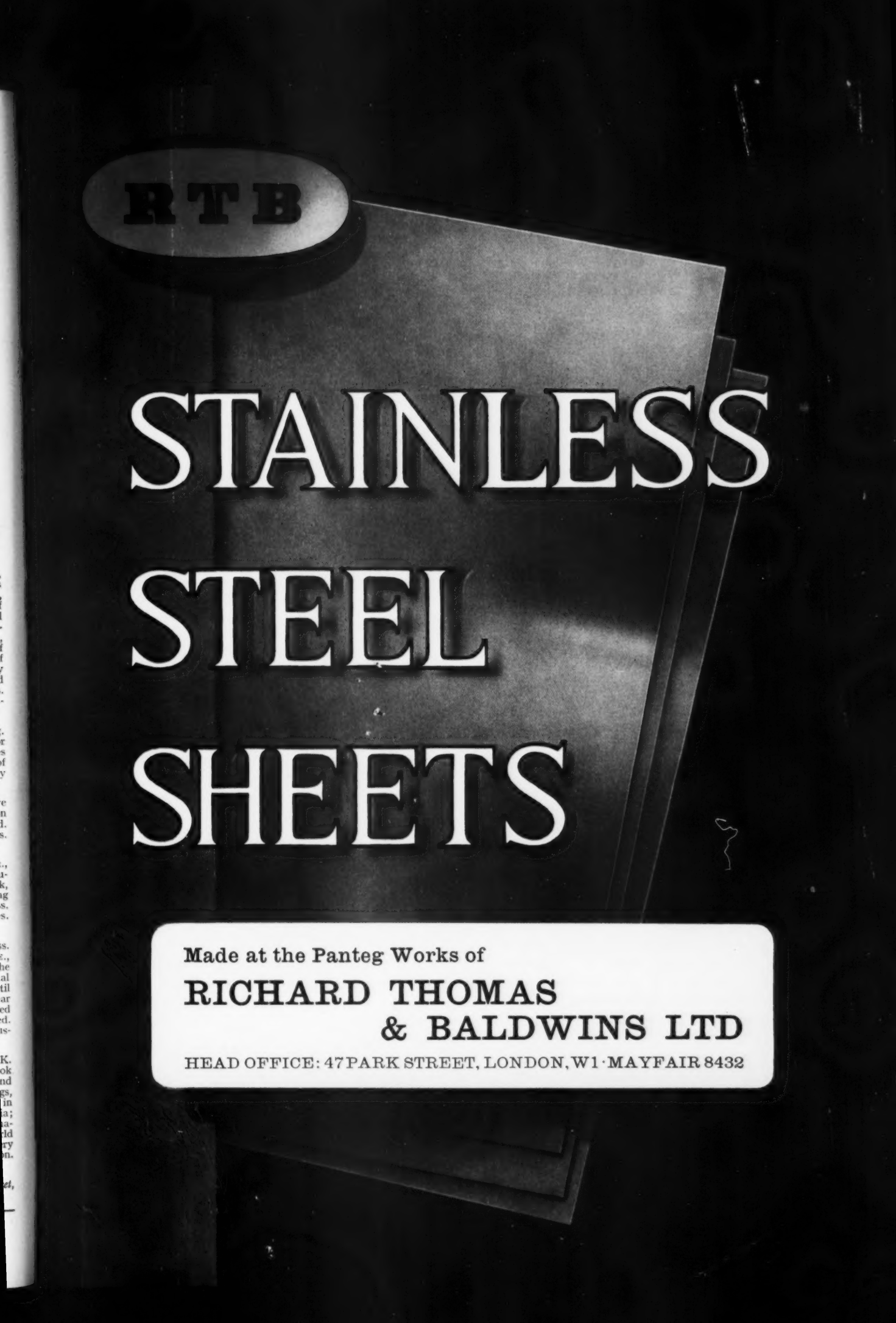
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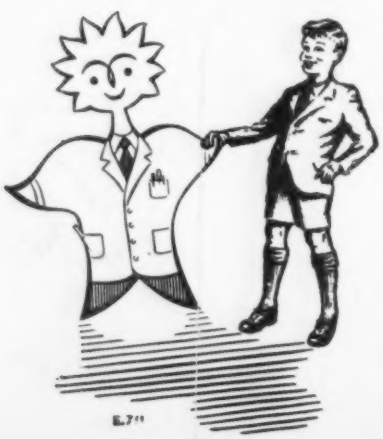

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